A

NEW SYSTEM

OF

HUSBANDRY.

Price FIFTEEN SHILLINGS.

Varlo (C.)

K

BRITISH MUSEUM

A NEW SYSTEM OF HUSBANDRY.

FROM
EXPERIMENTS never before made Public.
With TABLES ſhewing the
EXPENCE and PROFIT of each Crop.

How to ſtock FARMS to the beſt Advantage.
How the CROPS are to follow each other by the Way of Rotation.
On TRENCH-PLOWING, ſhewing how to raiſe good CROPS without Manure.
On REARING, BREEDING, and FEEDING CATTLE.
On a new diſcovered cheap FOOD for CATTLE.
A Deſcription of a moſt valuable moving SHEEP-HOUSE for eating TURNIPS on the Ground.
On CABBAGE Huſbandry.
On the NAKED WHEAT, &c.
On all Sorts of MANURES, MARLS, CLAYS, SANDS, &c.
With many choſen RECEIPTS for the CURE of all Sorts of CATTLE.
All which are calculated both for the Profit and Amuſement of the Country GENTLEMAN and FARMER.

TO WHICH IS ANNEXED,
A few HINTS particularly and humbly offered for the Peruſal of the LEGISLATURE.

BY C. VARLEY, Eſq;

THE THIRD EDITION.

IN THREE VOLUMES.

VOLUME I.

WINCHESTER:
PRINTED for the AUTHOR, by JOHN WILKES, 1772.

BRITISH MUSEUM

ENTERED IN STATIONERS HALL

ACCORDING TO

ACT OF PARLIAMENT.

TO THE

SUBSCRIBERS.

UPON ſeeing ſo reſpectable a liſt of worthy gentlemen ſubſcribers to this work, I am glad of this opportunity to return my ſincere thanks for their kind intentions to incourage uſeful knowledge; and certain it is, that there is no ſcience which deſerves the attention of the public more than that of agriculture, a promoting of which tends towards providing bread, which is the ſtaff of life, for all denominations of people; and a work of this ſort muſt be barren indeed, if it do not inſtruct to the amount of its trifling purchaſe.

I am,

Gentlemen,

your obliged and

moſt obedient Servant,

C. VARLEY.

THE

INTRODUCTION.

WHAT I here preſume to offer to the public is quite foreign from matters of genius and ſpeculation. It is merely a compendium and abſtract of matters of fact, of perſonal experiments and obſervations, for a number of years; and here I deliver to you the product of all that I have gleaned, with the varying allowances and reſpective inſtructions, touching the difference of the climate, the culture, and the ſoil.

As the utmoſt of my ambition is ſimply and clearly to convey my thoughts and meaning to the ſimple and unlearned; to be uſeful to them, I muſt be as plain and intelligible as my ſubject will admit. But ſhould men of improved genius, of letters and preciſion, happen to dip into this buſineſs, I truſt, that, whilſt they look down upon an author ſo much beneath them, they will have the goodneſs to pardon the defects of a writer, whoſe only aim and endeavour is to be underſtood by the farming part of the world. But if here and there they ſhould find any thing deſerving their inſpection or more particular attention; if they ſhould find ſome grains of wheat in the midſt of my chaff, or ſmaller parcels of gold in the midſt of my droſs, the honour of having contributed in any meaſure to their advantage, will be to me a high matter of payment and gratification.

And if the ingenious reader can improve upon my hints, he will be the more praiſe-worthy. The field of improvement is large enough for every one to try his talents in. A man muſt know much, to know every thing; a general knowledge is deſired by many, but obtained by none. In ſhort, every ſtep that leads to knowledge, or improvement, is worthy of being marked with laurels of gold.

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Counties in England.	Acres.	Houſes	Pariſhes	Market Towns	Hundreds
Bedfordſhire	260000	12170	116	9	9
Berkſhire	527000	17000	140	11	20
Buckinghamſhire	441000	18390	185	15	8
Cumberland	1040000	14820	58	14	5
Cambridgeſhire	570000	17350	163	7	17
Cheſhire	720000	24054	83	12	7
Cornwall	960000	26760	161	27	9
Dorſetſhire	772000	21940	248	22	29
Durham	610000	15980	180	9	4
Derbyſhire	680000	21150	160	11	6
Devonſhire	1920000	56310	394	37	32
Eſſex	1240000	34800	415	27	20
Glouceſterſhire	800000	26760	28	27	30
Herefordſhire	660000	12000	176	8	11
Hampſhire	1312500	26850	253	20	29
Hertfordſhire	451000	10570	120	18	8
Huntingdonſhire	240000	8220	79	6	4
Kent	1248000	39420	480	31	67
Lancaſhire	1150000	40000	61	27	6
Lincolnſhire	1440000	40590	295	35	30
Leiceſterſhire	560000	18700	192	11	6
Middleſex	247000	110000	200	7	7
Northamptonſhire	550000	2420	136	15	20
Northumberland	1370000	22740	460	12	6
Nottinghamſhire	632100	29500	143	9	9
Norfolk	1148000	47180	660	33	31
Oxfordſhire	534000	19000	280	12	4
Rutlandſhire	110000	3260	48	2	5
Shropſhire	890000	23280	170	16	15
Staffordſhire	180000	23740	112	19	5
Suffolk	995000	34420	575	28	22
Somerſetſhire	175000	50000	385	35	42
Surrey	592000	34220	140	11	13
Suſſex	1140000	21540	312	17	65
Warwickſhire	670000	21970	758	14	5
Worceſterſhire	540000	20633	152	12	7
Weſtmoreland	510000	6500	26	8	5
Wiltſhire	876000	28000	404	21	29
Yorkſhire	3770000	66150	536	57	26
	32530600	1068387	9684	712	673

5 JA 59

Counties in IRELAND.	Iriſh Plantation Acres.	Houſes in the Years † 1754 and * 1766		Pariſhes	Baronies	Boroughs
Ulſter 9 Counties	2836837	115539	128983	365	55	29
1 Antrim	383020	19071	20738	56	8	5
2 Armagh	170620	11261	13125	49	5	2
3 Cavan	274800	8318	9268	37	7	2
4 Down	344658	22914	26090	72	9	6
5 Donegal	630157	11097	12357	40	5	5
6 Fermanagh	224807	5478	5674	19	8	1
7 Londonderry	251510	13489	14528	38	4	3
8 Monaghan	170090	9587	10658	24	5	1
9 Tyrone	387175	14324	16545	30	4	4
Leinſter 12 Coun.	2642958	122900	127908	858	99	53
1 Catherlough	116950	5006	5444	42	5	2
2 Dublin	123784	21304	23103	87	7	4
3 Kildare	228590	8887	8555	100	10	4
4 Kilkenny	287650	11379	13231	96	9	7
5 King's Coun.	257510	8574	9294	56	11	2
6 Longford	134700	5038	6057	24	6	4
7 Louth	111180	8268	8150	50	5	5
8 Meath	326480	14277	14000	139	12	6
9 Queen's Co.	238415	10418	11226	39	8	3
10 Weſtmeath	249943	9271	9621	62	12	4
11 Wexford	315396	13015	11438	109	8	8
12 Wicklow	252410	7464	7781	54	6	4
Munſter 6 Coun.	3289932	109743	117197	740	63	26
1 Clare	428187	10014	11381	76	9	1
2 Cork	991010	43286	47334	232	19	12
3 Kerry	636905	11614	12112	84	8	3
4 Limerick	375320	17019	19380	130	10	3
5 Tipperary	599500	18325	18057	147	10	3
6 Waterford	259010	9485	8933	71	7	4
Connaught 5 Co.	2272915	47256	49966	330	43	10
1 Galway	775525	15420	15576	136	17	3
2 Leitrim	206830	4001	5156	21	5	2
3 Mayo	724640	13085	15089	73	9	1
4 Roſcommon	324370	8780	8216	59	6	3
5 Sligo	241550	5970	5929	41	6	1
IRELD. 32 Co.	11042642	395439	424046	2293	260	118

Houſes included. Dublin City † 12857. * 13194. Cork † 8113. * 7445. Limerick † 3672. * 3859. Waterford † 2628. * 2111. Kilkenny † 2071. * 2255. Belfaſt † 5197. * 5295. Newry † 1561. * 1600.——N. B. 5 acres Iriſh are equal to 8 acres, 15 perches, and 105 pts. Engliſh. The Iriſh meaſure with 7, and the Engliſh with 5 1-half yards to the perch.

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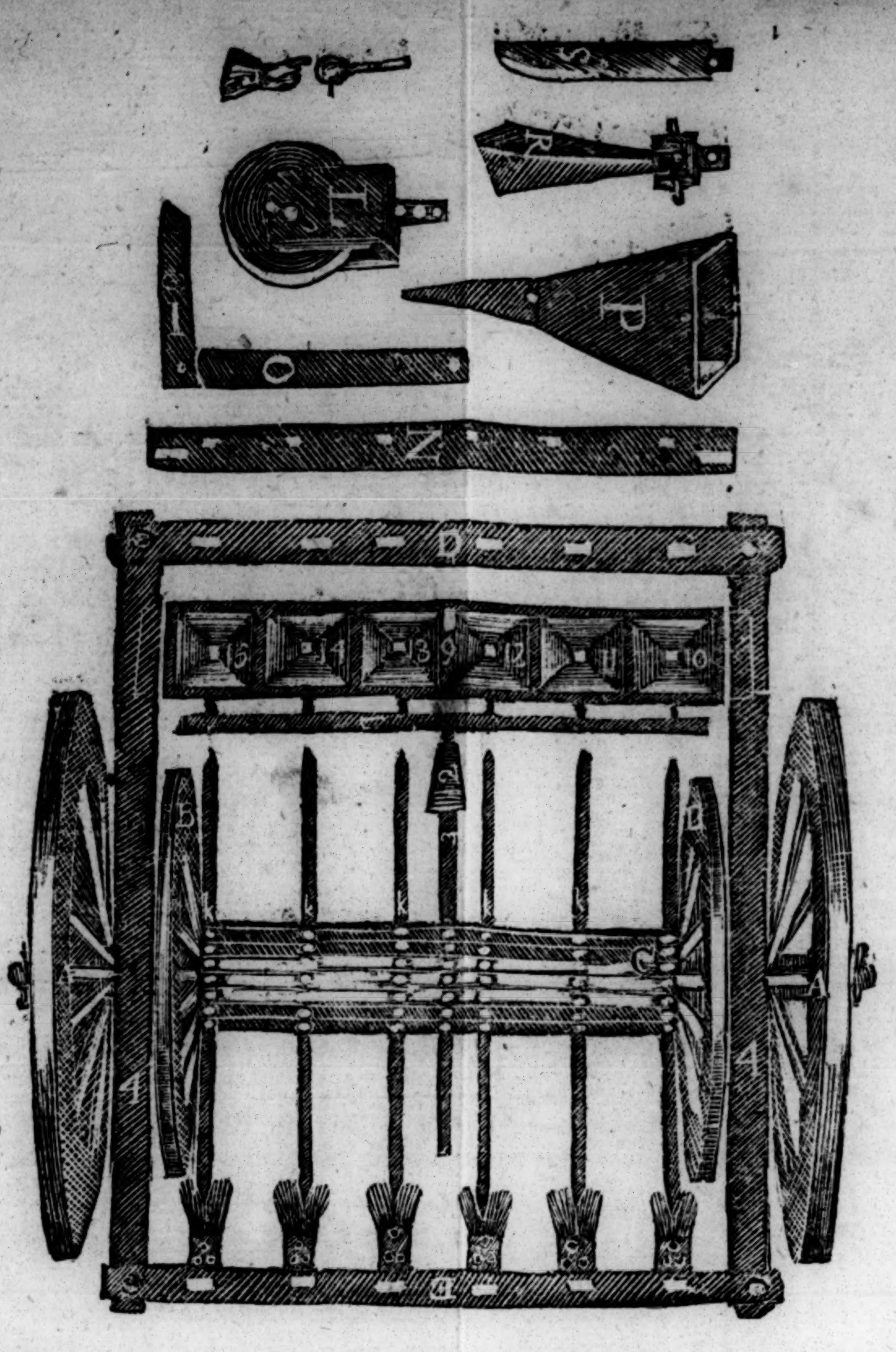

Explanation of the AUTHOR's *new-invented Machine, for the new Method of Huſbandry.*

ROLLER C, is five feet and a half long, and twelve in diameter; it has ſixteen flat ſides; in each are fixed ſix pins, at one foot diſtance from each other; as appears by the holes; ſo conſequently the number are ninety ſix, k, k, k, k, k, k, ſhew one row of theſe pins, each of which muſt be nineteen inches and a half out of the roller, and they will ſplay, ſo that the points will ſtand twelve inches from each other. If you would hole nearer, or farther at a diſtance from each other, it is only making the pins ſhorter, or longer in proportion. In each end of the roller goes a gudgeon, which the Frame 4, 4, lies upon.

The gauging wheels, B, B, go upon the end of the ſaid gudgeons, betwixt the frame and the end of the roller; theſe wheels are to gauge the depth the Pins are to ſink into the ground.

The wheels A, A, are put on occaſionally, to convey the Machine from field to field.

In E, are fixed ſtandards, oppoſite to each row of pins, in which are fixed ſix beſoms, to ſcratch the dirt off from the ends of the pins, in wet weather.

In the ſixteen holes round the middle of the roller, are fixed cog-pins, as ſhewn by 3.

10, 11, 12, 13, 14, 15, ſhew the mouth of the hoppers fixed in the ſeed-board.

P, ſhews one of theſe hoppers; the ſmall end or pipe of this hopper goes through the ſeed board, and near the ſurface of the earth, which, by the help of the ſliding-board, (as each end runs in a ſliding mortiſe in the frame 4, 4) you can move, and fix the pipes of the hopper over the holes in the ground at pleaſure.

The ſmall tongue, (ſhaped like a ferula, to which the hand points) is fixed in a mortiſe in the pipe; and the broad end preſſes againſt the upper-ſide of the ſlide board N, oppoſite to the holes; which board N, goes under the bottom of the ſeed-board, and through mortiſes made in the pipes.

The holes through the ſeed-board, and thoſe in the ſlide-board, are oppoſite to each other, when the machine is ſowing; but, by ſlipping the ſlide-board about an inch, it ſhuts both holes; which is neceſſary, and done with the touch of the finger, while the machine is turning the end of the ridge.

The mortiſe in the ſeed board, oppoſite 9, is, to admit the tenon of the frame in which the ſmall wheel runs, as ſhewn by L; this wheel is to bear up the hind-part of the frame of the machine, and can be made lower or higher; therefore it determines any diſtance you chuſe the pipes to ſtand at from the ground.

In the piece of wood ſhewn by 7, you ſee ſix ſmall pins, which go under the ſeed-board; theſe are the ſmall ends of the ſix tongues which play againſt the ſlide-board.

In the round part of the tongue goes a wire, about an inch long, which plays through the hole in the ſlide-board, among the corn, and keeps it from choaking or ſtopping.

This piece of wood 7, (together with a piece of iron which ſcrews into it, as ſhewn by 3,) preſſes down the ſmall ends of the tongues; and as they play upon a wire in the middle, the other end preſſes contrarywiſe againſt the under-ſide of the ſlide-board, which is opened and ſhut, when the machine moves, by the iron 3 playing upon the cog-pins, (which is in the middle of the roller) ſhewn by 2.

P, ſhews a piece of wood, which ſlides along the ground; it is three inches thick, but thinned to a feather-edge, by taking the timber away from one arredge; there are ſix, and each tenon goes into a mortiſe in d; this coverer plays in a ſwivel, as appears by the cut; this is, to gather the mold over the ſeed, and fill the holes.

O, ſhews a marker; it reaches to the middle of the horſe's enſuing track, in order to mark where he is to go the next time; there muſt be one at each ſide, becauſe he turns and goes, one time with his right ſide, and the other with his left, to the unſowed ground; that which is not in uſe is brought forward, and laid upon the ſhaft; they are faſtened to the frame 4, by iron ſcrews. I, hangs down to trail along the ground, to ſcratch, and ſhew the track where the Horſe is to go.

In E, are fixed two hooks, on which a pair of ſhafts or ſiles (like thoſe of a cart) goes, by which the horſe is to guide and draw the machine.

By taking out the iron clapper 2, you may hole without ſowing, or you may omit making the hopper-board, (in which moſt of the nicety depends) and ſtill you will find the holing machine extremely uſeful; becauſe, when the ground is holed, ſeed may be dropped into each hole by children, grain by grain, at a very ſmall expence, as appears by the table on this work; as alſo, when you hole the ground for tranſplanting, you are to take no notice of the ſeed-board.

A
NEW SYSTEM
OF
HUSBANDRY.

CHAP. I.

On the newly diſcovered and moſt valuable Method of TRENCH-PLOWING, by which any Sort of Ground may be kept in perpetual good Order, ſo as to produce good and clean Crops for ever, without any other aſſiſtance of Fallow or Manure than what itſelf produces, &c.

HOWEVER marvellous this valuable method of trench plowing may appear at the head of a chapter, yet ſtrength of argument and experience gained from repeated trials, prove, beyond a contradiction the truth thereof, and that it's utility extends alſo to every ſort of land, though indeed ſome may perhaps receive more benefit from it than others, yet every candid reader, who will diveſt himſelf of partiality, and liſten to plain reaſon.

It may not be amiſs to make a diſtinction between trench-plowing and deep plowing, as they may both ſeem to convey the ſame meaning, tho' in fact both the method of performing the work, and the produce in the crop, are quite different.

Deep-plowing is meant, when the plowman turns up a thick ſod, and leaves a deep furrow or trench behind him, which is generally practiſed when a farmer ſees his land over-run with weeds, (expreſſed by him dirty, which by the bye is too often the caſe) his method then is to plow deep, to bury the weeds.

By the word, bury, we naturally ſuppoſe he concludes them (as they certainly are) deſtructive to his crops, by feeding upon his labour; therefore as well as he knows how, wants to ſtop vegetation in them by burying, ſmothering, or killing them under a large body of earth.

Repeated experience tells him, that this method of deep plowing in ſome degree lowers the number of theſe troubleſome enemies, which if not checked by this or ſome other method, would entirely poſſeſs themſelves of his ground, by rooting out, ſmothering, or choaking any crop he threw therein.

Now if we find by experience, that deep plowing is in ſome degree uſeful, by deſtroying part of ſuch rubbiſh, it naturally follows, that their entire deſtruction, would redouble the ſucceſs in our crops; however by deep plowing alone we cannot expect this advantage; for though the ſod be turned over ſo thick, yet as it rears againſt another ſod, and lies hollow, it admits a circulation of air, which keeps vegetation alive, and forces up a mane or row of graſs or weeds in the ſeams between each furrow; therefore, I ſay, it is merely impoſſible to kill every ſort and part of weeds, ſo long as they lie within the reach of air, which is their life and ſpirit.

Indeed, if we make a fallow in a very dry ſummer, and plow deep and often, we may be ſaid to have a tolerable clean crop the year following, but in the ſecond and third crops and ſo on, we ſhall find the weeds and graſs daily gathering ſtrength again; ſo that it is evident, the fallow year did not infallibly deſtroy them, it only ſickened or retarded their growth for a ſmall time.

Docks, thiſtles, nettles, ſcutch-graſs, or by ſome called quicks, and many other roots, will grow though you turn them a thouſand times over with the plow, or any other inſtrument; yet they may be not only effectually deſtroyed, but converted to a friendly and uſeful manure, or food for other plants by trench plowing: therefore let us turn our eyes on this valuable method, and trace out by ſound reaſon, where their deſtruction is practicable, and the many good effects ariſing therefrom.

The word trenching is commonly made uſe of by gardeners, when they dig a piece of ground two or three ſpade grafts deep, in performing of which, they firſt make a hole as deep as they propoſe to dig, then they pare off the upper ſod ſo deep as it contains any graſs or weed-roots or any ſort of rubbiſh, and throw it to the bottom of the ſaid hole or trench, together with any ſtraw or long dung, which they want to convert into rotten manure, as ſuch are not proper for a top-dreſſing.

This done, they cover it with the ſecond and third ſpade graft, ſo that the bottom of the ground, to the depth of two or three feet, now becomes the top; this is called by the gardeners trenching, though it is not practiſed ſo often as it ought, but every ſenſible experienced gardener will follow this method, as by it he kills two birds with one ſtone, as it were, for he not only throws the ſod or rubbiſh out of his way, from being obſtructive or troubleſome to him in ſowing his crops, but it is a kind of dung-hill or hot-bed under them.

Scutch-graſs, weeds, or other rubbiſh being out of their growing latitude, and for want of air, putrefy and ferment, and every fermentation cauſes a friction, which naturally brings on a heat, in proportion to the ſize of the body that actuates it.

As for inſtance, the heat of a hot-bed, is in proportion to the quantity of dung put together in a heap, which if large, the heat is great alſo, and which is ſenſibly felt by putting a hand therein, and the ſtrength of the heat abates as the ſize of ſuch bodies grow leſs, till it cannot be diſcerned by the touch of the hand.

Though reaſon tells us there is a degree of heat in every body that putrefies or ferments, be it ever ſo ſmall, even till it comes to a ſingle ſtraw or fibre of a graſs root.

Philoſophical reaſons prove this, though we cannot ſenſibly feel it by handling; but to account for it:

Put two bodies together, and that which contains the greateſt degree of heat, has the greateſt ſenſe of feeling.

Likewiſe the ſenſes of our reaſon is quicker than that of our body, becauſe the former is the effect of the ſpiritual underſtanding, but the latter is only that of a corruptible body.

Suppoſe two perſons, one having a hot hand, and the other a cold one, (as is commonly expreſſed) theſe being joined together, the cold hand ſhall feel the other hot, but the hot one can diſcover no more heat in the other, than were it to handle ice; yet our reaſon proves beyond a contradiction, that ſo long as blood circulates in the coldeſt hand, there is a great degree of heat therein, though the hotteſt hand could not diſcover it.

This ſmall ſketch of philoſophy, is no way foreign, but rather eludes to my ſubject, as it ſerves to prove the utility and reaſonableneſs of cauſing a fermentation, in as great a degree as we can, by burying every ſort of ſods, weeds, or other combuſtible matter, under a ſufficient body of mold, in order to cauſe putrefaction, which naturally brings on a working or friction, that opens the particles of earth around it, which not only nouriſhes it, but affords ſufficient cavities therein to admit a communication, and an unitation of the different oils, ſalts, or ſulphurs, that each of theſe corrupted bodies, may when rotten produce, and which are as various, and differ as much in the ſort of manure, as the aſpect of the plants did from each other when in their vigour or growing ſtate, and though ſome plants, may, when rotten, produce too much acid or ſharp ſpirits; yet, when impregnated or mixed with thoſe of a more oily, ſmooth quality, one extreme checks another, and together affords a friendly manure, or food for the plants to feed upon.

In ſhort many good effects may derive from this method of covering, or burying the upper ſod, with a proper quantity of the under ſtratum, or maiden mold.

Firſt, this ſod be the ground ever ſo poor is interwoven with various ſorts of roots, either of graſs or weeds, both of which are very obnoxious and deſtructive to any crop we can ſow therein, for they not only feed upon what ſhould nouriſh the profitable plants, but they take up the ground that ſuch plants ſhould ſtand upon, and alſo hinders the free circulation of air, ſo that if not eradicated, will entirely poſſeſs themſelves of the ground; and we ſee that the beſt fallows, or deep plowing is not capable of making a total deſtruction of ſuch enemies; at the beſt it is only half doing the work, for they ſoon recover and re-eſtabliſh themſelves, to the no ſmall mortification of the tiller.

But by covering the ſaid ſod, thus interwoven with graſs, weeds, &c. with a body of mould, we not only get quit of them as enemies, but are at the ſame time converting them into a kind of a hot-bed, dunghill, and fallow.

In ſhort, by being thus buried, they act in all theſe capacities, for being covered only by ſeven or eight inches of earth, they cannot vegetate, ſuch a body incloſes them from the air, and nothing can grow without it; therefore what juices they contain, immediately begins to ſweat, ferment, and putrefy, all which cauſes a friction, or working of the different ſpirits together, ſome part of which fumegates or evaporates through the body of mold by a ſteam or ſmoak, (if we may compare great things to ſmall) in the nature of a dunghill, or hay-ſtack, when newly put together, and in the ſtate of fermentation, our eyes and feeling can witneſs for the latter, and ſo may our reaſon for the former. Therefore while it is in a ſtate of fermentation, it acts in ſome degree as a hot-bed, which nouriſhes and enriches the earth and plants about it; when the ſtate of fermentation is over, it then acts as a manure, and food for plants, whoſe fibres will naturally ſtrike down to feed thereon; and what is yet farther in its favour, it may juſtly be called a fallow in reſerve, and a dunghill without labour or expence.

Yet more, it is not only for a year or two, but will hold good for ever, becauſe the ſod that is trench-plowed under this year, will be effectually rotten and mellow, ready for turning up the next, and when it is turned up, you turn down another weedy ſod, or furrow in its place, and thus go on alternately, turning up a dead rich mellow mold, and down in its place a tired, weedy, or a graſſy ſod.

I am certain that when this practice is thoroughly adopted, no manure or fallow need ever be applied, as none can be ſo good as ſuch a dreſſing.

Nevertheleſs I do not exclude marling, claying, or ſanding, theſe are generally put on to change the ſtaple or nature of the ground, and may be as uſeful in this, as any other ſort of tillage, but ſhall refer my reader to the chapters that treat on theſe articles; and it may not be amiſs, before I quit this chapter, to clear up a doubt which I ſee ariſe in my reader, in regard to killing all ſorts of weeds by burying; for ſays he, quicks or ſcutch-graſs, docks, nettles, thiſtles, and ſuch ſort of roots, will grow or ſtrike downwards, perhaps two feet or more, therefore how can they be buried or killed with plowing a dozen or ſixteen inches only?

My reader is to conſider that theſe, no more than every other vegetable, can live or vegetate without a ſufficient quantity of air, and though a tap-rooted plant may ſtrike downwards ever ſo far under ground, yet air is conveyed to every part thereof, by the tubes, veins, or leaders, taking in air by the external part or top of the plant, and which ſerves not only as mouths to take in nouriſhment, but as air-pipes to convey air to every part of the root, in order to keep vegetation alive.

But on the other hand, if ſix or eight inches of the top of any ſort of plant be taken off within the ground, and the remainder of the root covered with ſo many inches of mold, it will effectually ſmother and ſtop it from growing, as a few inches of earth over the crown of a plant, of any kind will ſtop the circulation of air, therefore cauſe a deſtruction of the root.

It is with the vegetable as with the animal creation, for neither can ſubſiſt without air; a land animal will live when put into water, provided the mouth or noſtrils be above the ſurface, but if theſe be covered with water only an inch, then the creature drowns, becauſe this body of water keeps out the air from circulating to other parts of the body of the animal.

Thus it is with weeds or plants of any ſort, for if any part of a plant come to the ſurface of the earth, it takes in air to keep the whole body thereof alive, whereas if the whole be covered, ſo as to exclude air from any part thereof, that plant muſt immediately die and turn to corruption.

All the difference there is between a land animal drowning with a ſmall body of water over it, and a plant requiring a larger body of earth over it, is, becauſe water being a firm body, and a ſmooth glaſſy ſurface, therefore a thin ſheet thereof will exclude air from entering therein; but earth when under tillage breaks into lumps or clods, and is ſometimes intermixed

mixed with ſtones, ſo conſequently keeps the mold looſe, and open, which admits air through it.

Therefore if the plants be not covered with ſix or eight inches of mold, they may be ſupplied with air through ſome of theſe cavities, and the rougher the ground is, the greater chance they have to meet with this ſupply; for the finer the ground, the cloſer it falls; and to help to conſolidate it the more, it may not be amiſs to run land that is trench-plowed over with a heavy roller; by ſuch precautions there is not the leaſt doubt but you may ſmother every ſort of weeds with ſix or eight inches of mold over them.

The worſt root that is to ſmother, as may appear to ſome tillers, is ſcutch-graſs, and yet I know from experience, that this is to be effectually ſmothered by trench-plowing, provided that the firſt plow go to the bottom of it, and turn the root all to the bottom of the trench, ſo that the ſecond furrow raiſed be all maiden earth, and thrown cleverly over the firſt.

This will incloſe it that no air can come at the weed to raiſe it to vegetation. The root of ſcutch-graſs, though very long, yet it moſtly runs horizontally, keeping near the ſurface, and will interweave and mattraſs together with the ſod or furrow to ſuch a degree, that it is hard to part or break it to pieces with either plow or harrow, and is not at any rate to be deſtroyed, but by raking or picking out by mere dint of labour and expence, and ſo burned; and even in this caſe it is not to be totally deſtroyed, for if pieces no more than an inch long remain, they will grow and quickly increaſe to an immenſe degree.

In ſhort, there never was a method found out to deſtroy it equal to trench-plowing, and with this, as with all other weeds, its deſtruction is the birth of a large portion of manure, as above obſerved.

Were I to have my choice for trench-plowing, it ſhould fall upon the moſt graſſy or weedy piece of ground I could find; the greater the quantity of ſuch rubbiſh buried, the richer the ground would be at the next turning up.

It is not above ten months ago, ſince I entered upon a piece of ground that was over-run with weeds, which grew as high as a man. I ordered it to be mown, and the haulm, together with the firſt ſod, which contained the roots, to be buried or trenched two ſpades deep; this had the deſired effect; for though this has been a wet ſummer, very few weeds grew; and I am confident if I had not taken this method it would have coſt me as much weeding as the crop was worth. I tried the ground, and found it as rich underneath as a dunghill, comparitively ſpeaking; every weed, both root and branch was melted and incorporated among the mold, which has turned it black and rich paſt conception. The reaſon which firſt induced me to be ſo ſtrong an advocate for, together with the method of, trenching land, as near Glaſgow, may be read in the next chapter.

CHAP. II.

Some further Remarks on TRENCH-PLOWING, together with the Method and Price of TRENCHING-GROUND with the Spades, as near Glaſgow, &c.

AS I ſome years ago, publiſhed a work of Huſbandry, intitled *The Yorkſhire Farmer*, and as one chapter in the ſaid work relative to deep-plowing, ſeems to claſh in ſome degree with my preſent ſubject, it may not be amiſs to clear up that point, leſt both my works ſhould fall into one hand, and the contradiction give my reader a bad idea of my morals, by carrying as it were, two faces under one hood; but this I aſſure him is quite foreign to my principles, for I never yet ſtrove to ſupport either a verbal or written argument, but at the time my words or pen agreed with my heart.

Every man ought to lay himſelf open to conviction, but until he is convinced, he ſhould ſupport his argument with all the rhetoric and ſteadineſs he is maſter of: but if his antagoniſt, by the ſtrength of argument, good ſenſe, or quoted circumſtances, prove him wrong, he ought moſt candidly to acknowledge it, by confeſſing himſelf ſo.

Such a condeſcenſion ſhews a good diſpoſition, and generally gains more upon the hearers, than the beſt ſupported argument, when left undecided.

I muſt own, that at publiſhing my firſt works, my opinion was more in favour of ſhallow-plowing than at preſent; it is true I was not in general for ſhallow-plowing, I confined it to different ſoils, deep-plowing to deep good land, and ſhallow-plowing to thin bad land, whereas I am ſince thoroughly convinced by repeated experiments, ſtrength of argument, and reaſon itſelf, that I was wrong.

For if the land be thin, having a bad ſoil under it, is the reaſon why it ſhould be made deeper, and that by plowing, as no other method but turning up the under ſtratum can have the deſired effect.

He that is afraid of letting his plow ſink deep, for fear of turning up bad earth, is like a timerous ſurgeon, who is afraid of probing a wound to the bottom; he may make a ſmooth ſurface, but the inſide will always be a thief preying upon his ſubſtance.

The land that I was till lately the moſt afraid of turning up, for fear of ſpoiling, or filling my crops full of weeds, was that called ramel, a ſort of hard red ruſty earth, which generally lies near the ſurface, it runs in a cake, and where it happens

pens the land is generally wet, for it is of ſuch a firm nature, that it will not let the water penetrate through it, but bears it up among the upper ſtratum: no tap-root plant can grow in ſuch land, even thiſtles are debarred their entrance, and if any grow, they are only of a poor dwarf kind.

The thickneſs of this cake or bed of ramel, is generally about three inches, and when the plow breaks through it, it riſes in large pieces; it is very obdurate in its nature, and will take a great deal of labour in harrowing, &c. before it is ſubdued or brought to a ſeparation; but yet it is to be done, and in a year or two you looſe it, as it is mixed with the other earth.

This ramel abounds much in Cheſhire, Lancaſhire, many parts of Yorkſhire, in Norfolk, Suffolk, and in ſhort it is to be found in ſpots through the whole kingdom, and I have alſo ſeen it in Ireland, but not ſo common, as their land is generally deeper and better than that in England.

It is a prevailed opinion among all the farmers I have converſed with, that this ramel ſhould not be turned up, becauſe it fills the land full of weeds, particularly thiſtles, and till lately I was of the ſame opinion, for it is ſeemingly ſo glaring a truth, that there is no contradicting it; and now, perhaps, I am the very firſt perſon that ever wrote in the vindication of turning it up.

But I never undertook this taſk, till I was thoroughly convinced both by reaſon and experience that I was right, and that for the very reaſon that thiſtles and other tap-rooted plants flouriſh more abundantly when this bad earth is broke through and turned up, is the very reaſon why it ſhould be turned up.

Were I to ſtop here, the reader would certainly either think me a mad-man or a fool to inſert ſuch á thing, ſo blind and barren is nature if not cultivated by reaſon and experience.

But the thing is plain, if we conſider it right, becauſe if we break and examine the particles of this ramel or bad earth, we ſhall find that it contains no ſort of root, fibre, or ſeed, neither is it poſſible for thiſtle or any other plant to grow thereout, no more than out of a brick; beſides were it to produce thiſtles, or ſuch like tap rooted luxuriant plants, it would no more be bad earth, but on the reverſe very good.

I make no doubt, but my reader has heard the tale of the blind man going to buy land, and when he kneeled him down to grope for a ſtrong thiſtle to tye his horſe to, they then told him there was none, upon which he rejected the land, rightly judgeing, that if there was ſtrong luxuriant thiſtles, he could not be far wrong in a purchaſe, as they always grow upon a rich deep ſoil, and the deeper and richer the land, the ſhorter and more flouriſhing is the plant, but as there was none, he had only half a chance, for though the land might be good, and the thiſtles rooted, yet there was as great a chance that it might be bad, and not able to produce them.

Though the tale is frivolous and ſimple, yet we cannot deny but it bears a ſtrong meaning, and leads me further to prove, that it is a contradiction in nature, to imagine that this hard bricky earth, called ramel could produce them, or has the leaſt ſubſtance to aid or aſſiſt in their nouriſhment; ſo far from that, neither the roots of thiſtles, or any other vegetable can enter it, therefore how can it contain either the root or ſeed of weeds, and when broke up (as is the argument of the farmers) produce them.

It is true whilſt it lies in its unmoleſted ſtate, it prevents them growing to perfection, by the ſame rule that it prevents every other profitable plant bringing forth their abundance, ſo conſequently keeps the land in its poor name, as nothing

thing can flouriſh to perfection whilſt it lies there, becauſe it is a bar between the roots and their food which lies under it in the third ſtratum.

It is here the farmers treaſure lies hid, and it is from this that ſprings the abundance of weeds ſo complained of, which though enemies, and feed upon what would maintain profitable crops, yet they plainly prove the richneſs contained in the third ſtratum.

I do not mean that there are any roots or ſeeds of weeds in this third ſtratum, which break out and grow when the ramel is removed; no, I abſolutely deny it, as that would be impoſſible, for how could they come there, neither can any thing grow without a beginning.

Occular demonſtration ſhews us daily, that weeds of all ſorts, and particularly thiſtles, will grow on every ſort of land, yet they may only be ſaid to flouriſh upon that which is good and deep, on ſuch they grow to a yard or four feet high perhaps, with very ſtrong ſtalks and branches, theſe ſhew the ſoil they ſtand on, to afford a great deal of nouriſhment, or it could not throw up ſo much refined matter, whereof the reverſe will appear, if the land be of a poor thin ſtaple; on ſuch, though there may be a great number of thiſtles on the ground, yet their poor ſtarved dwarfy ſize makes them not appear ſo conſpicuous, but however the root is there though in miniature, and when the ramel or bad ſoil is broke through, it then gives their roots liberty to ſtrike downwards, and feed plentifully on the richneſs that the third ſtratum or maiden earth contains.

Therefore that was overlooked, or ſcarce thought any thing of before, will now appear perhaps twenty times the quantity, becauſe each plant probably is twenty times the ſize; ſo that the farmer whoſe penetration goes no deeper perhaps than his eyes can ſee, may well look with amazement, and ſay he ſpoiled his ground, and made it full of weeds, though in fact the number is all the ſame, the ſize only is augmented; but I hope the above will convince him, that ſo far from ſpoiling his ground by breaking through the bad ſhell of earth, called ramel, he has only opened a paſſage for the roots to feed upon a better body of earth that lay before concealed, and that if he deſtroys the weeds, by any method (but trench-plowing to chuſe) he may be ſure that his annual crops will alſo flouriſh in turn.

It is ſtrange how far prejudice in favour of old cuſtoms will lead one, but true it is, that I am almoſt aſhamed of my ignorance, or want of penetration, when I firſt publiſhed my *Yorkſhire Farmer*, for in that, I held a ſtrong argument againſt plowing deep in bad land, and which was almoſt univerſally aſſented to by ſuch ſhallow farmers as myſelf; and is it not alſo as ſtrange, ſo many thouſands of people that I had converſed with on the ſubject, that I did not meet with one to contradict me or ſet me right, before I met with Mr. Baker, an Engliſh gentleman, who is patronized and encouraged by the Honourable Dublin Society, to make experiments in agriculture, and very proper he is for the purpoſe, being a very worthy, ſenſible, indefatigable man, and ought to be careſſed and encouraged by every one who wiſhes well to the cauſe.

This gentleman and I had a ſtrong argument upon the ſubject of deep and ſhallow-plowing, (as to trench-plowing we neither of us touched upon, as I believe we had neither of us ever tried it at that time) though Mr. Baker's argument was ſtrong and ſenſibly maintained, yet it was not deciſive, becauſe he did not bring proofs ſufficient for the purpoſe, indeed I have thought ſince, it was for want of time, for we were rather hindered in our diſcourſe; however he told me at parting, in general terms, that he would not be of my way of thinking, to plow ſhallow upon any ſort of land for a thouſand pounds.

In ſhort, his diſcourſe gave me ſuch a turn, that I was determined never to ſtop enquiry or trying experiments, till I had proved the affair to the bottom.

Upon which I took a tour through Ireland to every gentleman that was curious in agriculture.

I have, by great chance, met with people that would be tearing their ground up by the plow-beam away, but after a very ſlovenly manner, with the long, old, Iriſh plow, a ſad piece of machinery as can be; when I aſked the reaſon why they plowed ſo deep, the anſwer was, becauſe the land was poor, and they had no manure for it, therefore could get no crop, except they plowed deep to turn up freſh earth.

By enquiry, I generally found that the ſame land had been plowed deep, at ſome former diſtant period of time, and that they ventured to plow deep, becauſe they knew the land would bear it, as it had been deep plowed before.

Upon the whole, their ideas were confuſed, their method was partly the effect of wild chance, and not to be depended upon; however, what I did gather, joined to reaſon, ſerved to prove in favour of deep plowing.

In the county of Wexford their land has a good deal of ramel under it, and ſome lies near the ſurface, therefore they are afraid of deep-plowing, however I know one farmer that broke through it, and the conſequence was, that he had a great crop both of weeds and oats, when I ſaw it, both of which ſhewed a great deal of richneſs in the ground, for the ſtraw of the oats was like reeds, but the weeds, particularly thiſtles, were ſo ſtrong, that I doubted they would get the better of the corn, except the farmer beſtowed much labour in weeding.

This was the firſt crop after breaking up, and I never ſaw it afrer.

I alſo viewed a field belonging to the earl of ——, in the ſaid county, which contained a dozen or fifteen acres, which was bad, wet, and ruſhy, occaſioned by a bed of ramel or ruſty hard earth, which lay within eight or ten inches of the ſurface, and as it lay within view of his houſe, was an eye-ſore, therefore he was reſolved to enrich it at any rate or expence, but like the reſt of the farming world, was afraid of filling his land full of weeds if he broke it up, and tilled it among the corn mold.

He therefore trenched the cloſe with ſpades to ſet with potatoes, as explained in Vol. II. chap. 7. in performing of which he at the ſame time broke up the bed of ramel, which was three or four inches thick, and carried it all off the land; this great work was going on when I was there, ſo know not the conſequence, but am clear, if it had been broke and mixed on the land, it would not have added to the number of weeds.

The Right Honourable Lord Chief Baron Foſter, had a piece of ground at Colon, which had one of theſe ſtratum under it, the ſurface was a black earth, in the nature of a bog, or a moor covered with ling or heath, it was always wet and poutchy when reclaiming.

He could make nothing of it till he broke through the hard under-ſtratum, and limed it well, which brought it from being not worth ſix pence an acre, to be worth four and twenty ſhillings an acre, which is the price he let it for, if I remember right.

I ſaw a good crop of oats upon the ſaid land that was quite clear of weeds, which ſhews, as there were none in the ſurface, the ramel did not produce them, for the land had been a wild barren waſte aforetime.

Upon finiſhing my travels and enquiries in Ireland, and comparing notes, I found nothing to back my former opinion of ſhallow-plowing, on the contrary, though nothing was deciſive in the favour of deep-plowing, yet every argument ſeemed to lead that way.

Upon my return to Dublin, I fell in company with ſome Scotch merchants, our diſcourſe ran upon agriculture, one of them told me that he lived near Glaſgow, and that in his neighbourhood, the farmers went to the expence of three pounds an acre, to trench their ground, by digging two or three ſpade grafts deep, and that they found more benefit from this, than ſo much money ſpent in manure, though they could have lime or dung from the city of Glaſgow very cheap.

This account ſurprized the company, and did not fail to draw ſome cenſures upon the Scotch gentleman, as they thought he derogated from truth, concluding, that the worſt farmers in the world would not be guilty of ſuch a folly.

To be ſhort, I immediately made a journey to Scotland, and as the gentleman told us, ſo I found it, for in an open town-field joining to Glaſgow, and in another about two miles diſtant from the ſaid city, I found a great many labourers at work trenching, ſome two ſpades deep and a ſhovelling, and others three ſpades and a ſhovelling, for which they are paid from forty ſhillings, to three pounds an acre, according to the depth they go; I ſaw plainly that the ſucceſs in their crops, by this method were not doubtful, for as their land had been trenched two or three years before, the earth they threw up from the bottom of the trench, was as black and rich as a garden mold.

As this work was performing in an open town field, there were ridges that belonged to farmers which never trenched their land, upon trying theſe ridges, at two or three ſpade grafts deep, we found the under-ſtratum a red hungry ſand; therefore it was evident, that by trenching, the nature of the ſoil had been changed, and when the crops began to appear, it was eaſy to pick out every trenched ridge in the field, by their aſpect, being better corn and clearer of weeds.

But as I have taken notice of this piece of huſbandry in my journal through Scotland, I refer my reader to the fifth chapter, in the third volume, for a farther account thereof.

An experiment partly of the ſame nature was tried by a gentleman in one of our ſugar iſlands, but now lives near the city of York; though the diſtance is great, and the climates in thoſe iſlands, much hotter than England, yet the nature of the land is nearly the ſame.

The land on which this experiment was tried, and where the ſugar-cane grows is ſand, the under-ſtratum is a hard binding gravel.

The gentleman who tried the experiment, told me, that it is ſometimes cuſtomary after they reap the firſt crop of cane, to let the land lie unmoleſted or uncultivated, and it will bring a ſecond crop, which is inferior to the firſt, yet as it is attended with leſs expence, anſwers ſometimes very well.

A plantation containing ſix acres of cane was reaped, and the land was let lie for a ſecond crop, but obſerving that it promiſed to be bad, the ſaid land was trenched to a good depth, the upper ſtratum was buried, and in its place turned up a hard ſtrong gravel, ſo that the land had more the appearance of a gravel walk than that of a ſtaple for any thing to grow in.

This being a thing quite out of the common method, the eyes of the planters were upon it, and the opinion of every one was, that the land was ſpoiled; ſome would have it that it would never grow any thing more, others, that it would produce a plentiful crop of thiſtles.

In ſhort, the ſix acres were planted with ſugar cane, and contrary to all their expectations, produced a wonderful crop, which was two hogſheads and a half of ſugar each acre, beſides the offals, which more than pays all the expence.

This ſhews that trenching ground in any climate or land is profitable.

The ingenious Mr. Young's ſix months tour, has juſt fallen into my hands, I note an experiment tried in trench-plowing by a very worthy getleman, near Crakehill, Yorkſhire, which ſeems to corroborate with all the experiments I have tried or met with, and I cannot do greater honour to Mr. Young, than to give it to my readers in his own words, which are theſe following.

The capital improvement effected in tillage, conſiſts in trench-plowing. In the year 1765, was plowed eleven acres of land the rent of which was ſeven pounds; it was firſt cut by a paring wheel plow, worked by three horſes, and then came a ſtrong wheel plow, drawn by two oxen and ſix horſes, by which means a depth of ten inches was gained, and the eleven acres was finiſhed in eighteen days, a man followed the plow, to tread down the ſods, ſix out of the eleven acres were ſown with barley, and produced as in the following table:

	l.	s.	d.
Six acres produced twenty-one quarters three buſhels of barley, ſold for - - - - - - -	28	7	0
Three acres and a half were with turnips, and ſold for - -	14	6	1
They were fed off with ſheep, and kept thirty-nine for 18 weeks			
Another acre of turnips was ſold for	4	0	0
Beſides theſe articles, the field produced five buſhels of tares -	1	0	0
Two buſhels and a half of white peaſe - - - - - - - -	0	10	0
Thirty buſhels common potatoes	3	0	0
Nine ditto early, at 3s. per -	1	7	0
Which is per acre - - - - -	4	15	5
	52	10	1

This crop is upon the whole very conſiderable, the land was before ſuppoſed to be very bad, and the rent was trifling; beſides this ſpecies of improvement has been generally ſuppoſed to operate very little at firſt, the ſourneſs of the under ſtratum of the ſoil requiring ſome time to be ſweetened and meliorated by the influence of the atmoſphere, ſo that ſuch product the firſt crop muſt be thought a very great one.

	l.	s.	d.
In 1766, four acres of this field were ſown with barley, and produced nineteen quarters, the price not minuted, let us collate as before, 27s. per - - - - -	25	13	0
Six acres and a half yielded turnips, ſold at - - - - - - - -	16	10	0
Fifty buſhels of potatoes, at 2s. 6d. - - - - - - - - -	6	5	0
Which is per acre - - - -	4	8	0
	48	8	0

	l.	s.	d.
In 1767, the field was cropped with maſlin and barley, four acres of the firſt, produced ninety-two buſhels, ſold at 4s. 6d. per -	20	6	0
Six acres of barley produced twenty-nine quarters and five buſhels, at 23s.	34	1	2
One acre not ſowed			
Which is per acre - - - -	5	8	8
	54	7	2

This experiment, which is particularly valuable, proves in the ſtrongeſt manner, the excellency of the practice. If the reſult of three years experience, does not ſatisfy the moſt cautious cultivators, I know not what will. Our author ſtill goes on, ſays he—In 1766, the ſaid gentleman trench-plowed in the ſame manner as before, another field of five acres, and harrowed in oats on one part of it, and beans on the reſt, the crop was, viz.

	l.	s.	d.
One hundred ſixty-ſeven buſhels of oats, at 2 s. 6d. - -	20	17	6
Twenty-eight buſhels of beans, at 3 s. 6 d. per - - - - - -	5	5	0
Which is per acree - - -	5	5	10
	26	9	6

The above experiments give me great pleaſure, as I know the land only to be poor and of a bad nature, and more ſo, as it is a ſpecies of land I have not in my poſſeſtion to make this experiment upon.

I cannot help taking notice, that both the tryer and compiler of theſe experiments, ſeem to have no idea of the grand point, namely, that of again turning up the ſod when the roots, &c. were all rotten and turned to manure, which would certainly be the caſe, by the time the firſt crop was reaped. It appears that the ſucceſs in crops wás all produced from a maiden earth, without any aſſiſtance from manure; but if the old ſurface had been turned up, when reſted or rotten, by an interior fallow year, the proprietor would have found it enriched beyond expectation, and might have promiſed himſelf, if poſſible, a double return, and it might have been worked with two horſes in a plow, as the land would be light and mellow, after the firſt breaking up.

Indeed I am at this time trench-plowing ſome ſtrong clay land, and I only uſe two horſes in a plow, they ſeem to perform it with tolerable eaſe, but it will doubtleſs be much eaſier for them when trench-plowed again.

I have had ſeveral experiments tried on different ſorts of land, and every one proves beyond a doubt, that of all the improvements that has ever been found out in agriculture, trench-plowing is the moſt valuable.

I have two ſorts of land now under this experiment, one is a ſtrong clay, and as far as is tried, promiſes ſucceſs.

The other is ſand, but of a cold ſpungy nature, the furrows all ruſhy, I trenched the furrows only, on which I have ſown the following crops, viz. potatoes, muſtard among ſome of them, ſummer wheat, winter wheat, ſix rowed barley, and a new ſpecies of the cabbage kind, which is by the name I got it by, called Jeruſalem cabbage.

All the crops look extremely well, except in a ſpot here and there, where the red ſand was thrown up very thick, there the winter-cabbage was only weak and puny till the tap-root got through it, and began to feed upon the ſod, or under-ſtratum, which was rotting, then they throve amain.

The Jeruſalem cabbage has a remarkable ſtrong and penetrating tap-root. I ſowed the ſeed in the latter end of April, and by the middle of July the plants had got ſuch root in the ground, that it was with difficulty we could draw them. I imagine it will prove the heartieſt and beſt plant for winter feed of any that has been cultivated.

I did think of eating them with cattle, but as there is, perhaps, very little ſeed to be got in England, and as I think it very valuable, I purpoſe keeping moſt of my crop for ſeed.

The plant is of a purple colour, it will not turn to a cabbage, neither has it a ſtalk like any thing of the cabbage or cole-wort kind, for the leaves ſtrike out of the root, from the ſurface of the ground.

Where the plants have room, the leaves creep on the ground round the root, till they fill a great ſpace before they riſe.

The tap-root runs perpendicular like that of a parſnip. Upon the whole, I propoſe a great deal from this ſpecies of food for cattle; and it is, without exception, the beſt green I ever eat late in the ſpring.

I ſet my wheat in this trenched ground at twelve inches aſunder, putting three grains into each hole, it filled the ground abundantly, and there was few roots where I could not count from thirty to fifty ears. The land was graſs when I trenched it, and remarkably full of the red or cut worm; I was aware of this, therefore ſteeped all my ſeeds in the pickles as directed in this work, by which means I believe I ſaved my crops, as nothing was touched except a little of the wheat.

A TABLE

A TABLE

Of the Expence and Profit of an Acre of Trench-plowed Wheat.

	l.	s.	d.
To the rent of land, being graſs and plowed at Michaelmas	0	16	0
Tythe for the ſaid acre	0	5	0
Plowing	0	12	0
Seed	0	7	6
Sowing, harrowing and rolling	0	2	6
No weeding, as there was not a ſingle weed to be ſeen			
Reaping, and drawing into the barn	0	9	0
Total expence	2	12	0
To 41 buſhels 3 pecks of wheat, at 5s. 3d. per buſhel	10	19	2¼
Clear profit from this acre	8	7	2¼

I leave the ſtraw for threſhing.

CHAP.

CHAP. III.

How to fix the Plow to perform the Office of TRENCH-PLOWING, and how to perform the Buſineſs, &c. &c.

IN my foregoing chapters, I have endeavoured to quote circumſtances, and to inforce reaſons, in order to prove the utility of this valuable method of trench plowing, in this I come to the application of the work.

Though ſeveral learned authors have admitted both of the value and probability of trench-plowing, yet I do not remember one who has entered heartily upon the cauſe, or has pointed out a method how the farmer could perform the work with any reaſonable degree of expence.

Mr. Randal indeed went ſo far as to invent trenching-plows, and advertiſed them at ten pounds a ſet, but this was both too high in price, and too perplexed or complicated in working, ever to gain a footing among the common farmers, therefore the ſcheme though laudable and praiſe-worthy, fell to the ground almoſt at its birth.

But notwithſtanding Mr. Randal's ſcheme failed, I do not in the leaſt deſpair of ſeeing this valuable method of trench-plowing become general among the farmers, particularly as they may perform the work in an eaſy cheap manner by the common plow, with little alterations; for not any thing deters them more from putting any ſcheme in execution, than a ſhew of expence.

When we have fixed upon the ground to be trench-plowed, our next ſtep is to try the depth or ſtaple of the ſoil with a ſpade a ſpade, and from this we can judge what depth we would have it plowed, and ſo fix the plow and irons accordingly.

If the land be good and deep, the weeds, and graſs runs deep alſo, conſequently the upper ſtratum, or what compiles the ſod, is thick; in this caſe the firſt plow muſt be geer'd ſo as to run quite under all the roots, by which the next furrow when turned will be all freſh mold, or what is called maiden earth.

This being turned over the firſt furrow, which now lies at the bottom of the trench, is what the corn is to grow in the enſuing year, therefore muſt be a proper depth or thickneſs for that purpoſe.

If the land have a tolerable good bottom, you cannot go too deep, but if it be a very tough, hungry clay, or a poor red or white ſand, in either of theſe caſes, it may be prudent not to go ſo deep the firſt year, as it will only, if clay, be worſe to work, or break into ſmall particles, but whether clay or ſand, it may be too deep for the roots of the plant to penetrate through, in order to feed in the under ſtratum, and which they will ſtand in need of, in ſuch poor ſoil.

Therefore, I ſay, in ſuch land only, go a moderate depth the firſt, and add a little more the next trenching, for an enſuing crop.

Any common plow without altering, will turn the firſt furrow, and all that is wanted in the next, is only to add to the mold-board a caſt-off board, in order to raiſe the ſecond furrow over the firſt, and which is fixed after this manner, viz.

The firſt thing you are to obſerve, is to have the wing of your ſhare ſo broad as will cut your furrow clear the breadth you intend it; ſuppoſe it be ten inches broad, the ſhare muſt be alſo ten inches, meaſuring from the point of the wing to the land ſide, in this caſe the wing will be about five inches, you muſt have a thin plate of iron, about two inches and a half broad, welled acroſs the upper ſide of the wing of the ſocket, ſtretching from the breaſt of the plow to the point of the wing.

About half an inch of one edge only is to be welled, the remaining two inches is to remain open, in the nature of a flat ſocket, to admit a thin end of the turn-off board therein.

The turn-off board muſt be about four inches broad, and ſo long as will reach from the wing of the ſocket to the brich of the plow, it muſt be about two inches thick, and muſt have a bracket at the under ſide, in the nature of a foot of a fender, which bracket muſt bear upon the mold board of the plow, in order to ſtrengthen the caſt-off board, that it may bear the weight of the ſod when it riſes.

There muſt run horizontally through this board, a ſmall iron bolt, one end muſt be crooked like a T, this is to go into a long nick, made in the breaſt-plate of the plow; when in, it muſt turn half round, that it may hold faſt therein, by which means it will bind faſt the turn-off board, to the mold board.

Without any other help than this bolt, the bracket under, and one end being made thin to go into the ſocket, that is, in the wing of the ſhare, it will be ſufficiently ſtrong.

As many inches thick as you have turned the firſt ſod, ſo many inches the hind part of this board muſt be raiſed from the ſole of the plow, meaſuring at the brich, ſo that the ſod (as ſoon as it parts from the wing of the ſhare) riſes gradually till it comes to the brich of the plow, then it turns it fairly off, and it falls upon the firſt furrow.

By fixing this board properly, one plow may be made to perform the work two or three furrows deep. As the board is moveable it can be carried in the tail of the plow, the firſt furrow round, and when you come at the end, in the time the horſes are turning, it can be fixed.

I am at this time trench-plowing in ſtrong clay land, with one plow only, drawn by two horſes on a breaſt, one man to drive and hold, and has this moveable caſt off board, to fix for the ſecond furrow; he can plow about half an acre in a day.

There muſt be a cock at the beam end about ten inches broad, to take the plow off the land in the ſecond furrow, by ſhifting the hook to the near ſide.

This is all the addition or alteration that is wanted, for performing this great and valuable piece of work of trench-plowing; it is ſo ſimple and eaſy, that I doubt not but any common plowman may fix it, and the whole expence cannot be above ſixpence.

The more ſimple and eaſy any machine is made, the more valuable it is, provided it anſwers the end, ſo as to perform the buſineſs it is deſigned for.

CHAP. IV.

Shewing the proper Seaſons for TRENCH-PLOWING, together with a few philoſophical Reaſons relating to the Salts in the Air.

AS I have been very explicit in the foregoing chapters, in ſhewing the utility of trench-plowing, and where it operates or takes effect for the good of the crop, there only now remains to point out proper ſeaſons for performing the buſineſs in, with two or three philoſophical remarks thereon.

The farmers common notion of ſummer fallows are, that what good they receive, is, by being in a ſtate of reſt for one year, and by turning up the roots of graſs, weeds, or ſuch like obnoxious plants to the ſun, in order to be killed by the heat, when expoſed thereto.

They have no notion of the atmoſphere's diſcharging the oils, ſalts, or manures it contains upon their furrows, ſuch thoughts may be too ſublime for their underſtanding.

I do not deny but their intellects may be as ſtrong as thoſe of other men, but I refer to any ſenſible reader, if their ideas in general are not more confined than any ſet of men in the world; which is very ſurprſiing, when we conſider that their daily buſineſs lies more among the works of nature, than that of any other ſet of men whatever; therefore the exerciſe of which muſt afford more matter for philoſophy or contemplation, which brightens the mind, and opens the ideas to a refined underſtanding.

I can account for a farmer's want of penetration into the works of nature, in no better a manner, than a familiarity of his being always among them, by which his wonder ceaſes, his curioſity is ſatisfied, and his enquiry at end.

The returning ſeaſons put him in mind to ſow, and ſo does the crop when ripe to reap, his eyes convince him of the beginning and ending thereof, and therewith he is ſatisfied, without penetrating farther into the wonderful cauſe thereof.

Experience tells him, that a great quantity of dung forces him a good crop of corn, and is not wanting alſo to raiſe him a plentiful one of weeds.

This he ſees, but ſince labour and expence will eradicate them, he troubles his head no further about it; when his land is tired of corn, and overſtocked with weeds, his next ingenuity is to reſt it, and kill his weeds by a ſummer fallow.

This courſe of huſbandry chiefly takes in all his curioſity or enquiry into the works of nature. In ſhort the ſtupidity in ſome of them is ſo extremely great, that one would think one piece of miſmanagement which they are guilty of, could not eſcape the greateſt novice's underſtanding.

And that is, in letting their dunghills be over-grown with weeds; how often do we ſee dunghills covered with nettles, thiſtles, docks, &c. perhaps to the height of a man, their roots and ſeeds permitted to intermix thereamong, and then ſpread upon the land to grow, and cauſe pounds of expence to deſtroy what might have been prevented for a few pence.

Such courſe of huſbandry has gone on from generation to generation, without amendment by them; for any improvement we are fallen into of late years, is chiefly owing to gentlemen who farm their own eſtates, or to ſhop-keepers, publicans, &c. who live in great towns, and take farms, either for their amuſement or profit.

If we look through the whole kingdom, we ſhall find ſuch occupiers of land to have better crops than farmers who have been at it all their lives, and it is to ſuch gentlemen that we are indebted moſtly for any late improvement in agriculture, though they are generally taunted and laughed at by the country farmers.

Many a time have I heard them curſe ſuch like gentlemen farmers, and wiſh their crops might fail, for troubling themſelves with what did not belong to them.

I know it is only a few of ſuch bigotted old faſhioned farmers that will read this book, ſome are too covetous to buy it, and the reſt are either too proud or conceited in their own opinions, either to read or follow any inſtructions therein.

No, they would ſcorn to be book-farmers. What! ſay they, ſhall a gentleman, becauſe he can write, pretend to inſtruct me what to do with my land? Does he know better than myſelf, who has been brought up to the farming buſineſs all my life time, and perhaps on the ſame land too? A pretty joke indeed.

However, Mr. John Oldroad, ſhould your landlord, or any other Mr. New-invention, chance to put this book into your hands, I would have you to retire into ſome corner to read it, for fear any one ſhould ſee you bluſh, when you look at your own picture, drawn ſo nearly to life; and ſhould I be ſo fortunate as to open your ideas, ſo as to make you purſue any new plan, which will turn out for your own profit, be aſſured that I have my full reward and gratification therein; but to return.

I promiſed in this chapter to ſhew the proper ſeaſon for trench-plowing, which the following reaſons will prove to be at or before Michaelmas.

Firſt, becauſe by that time we reap the profit of the preſent year. If ſtubble land be the object for trench-plowing, let it be done as ſoon as the corn is got off, in order to bury the ſtubble, graſs, or weeds, whilſt they retain their juicy particles, which will add much towards rotting, fermenting, and enriching the earth; and ſince this method of burying them, anſwers a better purpoſe than the ſummer fallow for killing them, we have no occaſion to loſe a year's profit and much labour in plowing on that account.

Secondly, we may ſow any crop we pleaſe, ſuppoſe wheat after wheat, it matters not, ſince what mold produces the laſt crop is buried, and turned up in it's place a freſh maiden earth, that muſt be the chief ſupport of the preſent trenched crop.

Thirdly, if the under-ſtratum be turned up in the latter end of the year, it will be ſubdued, brought to temperance, and enriched by the winter's ſnow, froſt, and atmoſphere, which let the farmers think what they will to the contrary, contributes more towards enriching their land than the ſummer's fallow; and would they come rightly into this way of thinking, they would not let their land lie in a cloſe dormant ſtate all winter, but plow it and leave it open, in order to receive theſe benefits; but it may not be amiſs in this place to give a few philoſophical reaſons, how the air becomes impregnated with ſalts, and how they aſcend and deſcend to enrich the earth, &c.

As no proof is ſo convincing as occular demonſtration, I ſhall refer my reader to a ſimple experiment, which he may try by an onion, viz.

In the middle of winter, when onions are in their moſt dry and light ſtate, weigh one very exactly, then tye a thread round it, and hang it up at the top of a room, where no part thereof can touch the wood or any other matter.

As ſoon as ſpring puts in, it will begin to grow or vegetate into a long top, when it is in its moſt vigorous and juicy ſtate before it begins to weather, weigh it again, and you ſhall find its weight augmented ſurprſiingly, perhaps one third.

Now it is quite clear to the weakeſt underſtanding, that what it increaſed in weight was collected from the atmoſphere, as it had no connection with any other matter that could afford this addition.

Now ſince it is obvious that the atmoſphere or air is impregnated with oils, ſalts, or ſulphurs, which act as manure or food to the vegetable creation, my next problem is, how it came there, and this we can trace from various cauſes.

But nothing is better known and more clear to every farmer, than that ſoot is a good manure, and alſo that it is a collected ed matter from various bodies, ſuch as coals, ſticks, ſtraw, turf, earth, water, candles, oil for lamps, the ſteam of boiling pots, &c. All theſe, or as many as are burned in a room, evaporate and ariſe up the chimney, which is purpoſely contrived as a paſſage for the air, which attracts and takes with it all evaporated matter; and though we find great quantities of thoſe matters cling or adhere to the ſides of the chimney as ſoot, yet both our eyes, and reaſon tells us, that much greater quantities eſcape, and riſe into the firmament.

Beſides all theſe bodies uſually conſumed in houſes, which are very great, there are alſo other ſorts which ariſe from natural cauſes, ſuch as the ſteam and ſmoke of dung-hills, hay-ſtacks, or any ſuch matter, when in the ſtate of fermentation; likewiſe the burning of lime, brick, and burn-beating. In ſhort, all the animal creation aſſiſt in ſending manures into the clouds, both by evacuation and ſteam from their noſtrils, &c.

It is true, ſome things produce more ſalts, and richer vapours than others; as for inſtance, ſuppoſe we lay together two or three hundred weight of coals, and throw upon them five or ſix gallons of water, ſet the coals on fire, and they, together with the water, ſhall all aſcend in ſmoke, except a few pounds only of aſhes.

At the ſame time, if you burn in the ſame room ever ſo many candles, they ſhall all evaporate imperceptibly, mix with the ſmoke, from the aforeſaid coals and water, and all unite and join in the natural cauſe of compoſing three of the elements, namely, air, water, and earth.

All this is plain to the eyes and reaſon of any man, but how theſe bodies ſhould be divided or ſeparated, and again deſcend as manure, &c. is another queſtion, and perhaps not within the comprehenſion of every one.

From all the foregoing remarks and obſervations, we ſee the immenſe bodies of matter that evaporate and ariſe into the ſky. All the clouds we ſee floating about in the firmament, are compoſed of earth, water, and air, ſometimes the fourth element, fire, intrudes therein, which cauſes a convulſion, from which proceeds thunder and lightning, as fire and water cannot agree together.

The water is exhaled, drawn up or attracted, by the heat of the ſun; at different periods, the earth is divided into very fine ſmall particles, and mixed therewith, ſo that theſe two bodies, being incorporated together, are borne up in ſmoke by the air and exhaled by the ſun, ſo keep aſcending till they come at a pure, fine, thin, ſerene air.

Being arrived in this region or latitude, the heat of the ſun, together with the thinneſs of the air, rarifies and divides the ſalts, oils, and earth from the water, for the air in this region is ſo thin and fine that it is impoſſible for any groſs matter to remain therein, without undergoing a rarifaction, that cauſes a ſeparation of particles.

The two bodies or elements of water and earth, being thus divided, deſcends again to our earth, one in clear rain water, and the other imperceptibly in ſnow, miſts, fogs, duſt, &c.

Every farmer will admit that ſnow is a great enricher of land, which may be accounted for in this manner, viz.

When large bodies of water and earth aſcend into the upper regions, and when in the act of rarifaction there comes a cold eaſterly wind, which cauſes a great emotion, agitation, or tumultuous friction in the firmament, by which the waters are toſſed, tumbled, and chaffed to ſuch a degree, that they are raiſed into a white froth, and whilſt in this frothy ſtate, the extreme coldneſs of the air congeals and binds the earthy particles up with the water, ſo that both deſcend as ſnow upon the earth, and when melted or diſſolved, the water returns to the drains, but the earth or ſalts remain on the ground, and acts as manure, which we may ſee immediately to take place.

For after every ſnow we may diſcover the earth (particularly plowed land) very light, open and ſpungy, which is very plain, that ſome oils, ſalts, or ſulphurs, had penetrated therein and cauſed a fermentation, or we ſhould diſcover no more alteration in the mold after ſnow, than after a heavy ſhower of rain, which makes it generally remain ſad and cloſe.

A great deal of theſe enriching qualities alſo deſcend in the time of froſts, which penetrates, works, lightens, and enriches the earth, which upon the froſt going away is eaſily diſcovered.

I have gone through theſe allegations, in order to prove the value of winter fallow, or opening the ground to receive all theſe benefits.

Therefore point out the beginning of October as the beſt time for beginning to trench-plow in.

For as we turn up a dead inactive earth, the ſnow and froſts, as before obſerved, will not only ſubdue and temper it, if hard and ſtubborn, but alſo raiſe it into a lively fermentative action, and cauſe it to become friendly and mellow.

In February laſt I trench-plowed a piece of ſtubborn clay land, and though it only got a little froſt and ſnow in the ſpring, yet it reduced it more to temperance, and was of more real ſervice to the land, than all the ſummer fallowing.

Theſe, and many other good reaſons, I am clear, that ſet aſide killing the weeds, (and that is provided for in trench-plowing) a winter is far preferable to a ſummer fallow, for in ſummer the ſky is high, thin, and clear, and the heat of the ſun acts more ſtrongly in exhaling the ſalts, oils, and other vapouriſh particles of the earth, which float about in the liquid air, and is undergoing the ſtate of rarifaction a great part of the ſummer, but by the preſſure of the atmoſphere, being then overloaded with ſuch bodies, it deſcends in winter in the various manners aforeſaid.

All the aforeſaid reaſons prove beyond a contradiction, both the large quantity of manures the air contains, and alſo how it aſcends and deſcends to enrich the corn-mold; but however, notwithſtanding all this, the under ſtratum of ſome grounds will be ſo barren, that a top-dreſſing of ſome fine manure, ſuch as lime, aſhes, pigeon-dung, malt-duſt, or a compound of manures, may be adviſeable to throw on with the firſt crop.

But if the farmer's ſituation be ſuch, that he cannot provide himſelf with any ſuch manure, his next forecaſt muſt be to ſow ſuch crops as will do beſt without manure, and at the ſame time ſhould they miſs, he may have no great loſs therein, as for inſtance.

Should the land be ever ſo poor, and whether clay or ſand, if it be trench-plowed in autumn, it will grow vetches for a winter crop, and be the earth ever ſo dead or inactive aforetime, if any one thing begin to grow therein, it naturally brings on a lively fermentation, and when the crop is off, the roots become a manure: vetches is an excellent crop for ſuch trenched land, for ſeveral reaſons, particularly if eat on the ground with ſheep or ſmall cattle.

Firſt, becauſe the expence of the ſeed is but a trifle.

Secondly, what fodder it produces is in a manner clear gains, as they do not take the year's rent upon them, being ſown after the crops are reaped, and may be eat off the ground time enough to ſow ſpring-corn thereon.

Thirdly, by the trampling, urine, and dung of the cattle, the time they are eating the yetches on the ground, the land will be much improved thereby, ſo that it will be in condition for any crop the enſuing year.

A farmer ſeeing all theſe advantages, and comparing them with his own ſituation, and ſtate or ſtaple of his ground, may apply ſuch dreſſings, or ſow ſuch crops, as in all appearance, will afford him the moſt profit, and alſo bring his land into the beſt condition for the future, with the leaſt expence.

If the land be trench-plowed in the latter end of the year, and not ſown with any crop till ſpring, it may not be amiſs to give it a thin plowing juſt before ſowing with great care, though not to touch or turn up any part of the under ſod.

Then ſow the ſeed you intend, and harrow it in, which having no ſod to tear in pieces, it will be eaſily wrought, and fear not but you will reap more profit from this method of trench-plowing, than any other whatever.

And I doubt not but it will in time become a general practice, which I ſincerely wiſh, as my ideas are clearly open, and at one view, ſee the great utility that it will be of to the public in general, as well as to the farmer himſelf.

CHAP. V.

Explaining the AUTHOR's new-invented moving SHEEP-HOUSES, &c.

I HAVE often lamented the miſerable condition in which I have ſeen both ſheep and cattle, when eating turnips on the ground in a wet ſeaſon; particularly if the land was inclined to clay, or of ſuch a nature as to hold water.

How extremely diſagreeable muſt it be for the poor dumb animals to ſtand or lie in dirt, perhaps ſhoe-top deep, which is too often the caſe.

It is impoſſible cattle in ſuch a ſituation can thrive, or feed ſo well, as were they to lie dry, clean, and warm, neither can they eat the turnips with that freedom and appetite, when they are rolling or tumbling about in the dirt, as they would out of a clean rack or manger, not to ſpeak of the loſs and waſte in turnips when in ſuch a dirty condition.

This I believe will be aſſented to by every reaſonable man, and this alone was enough to retard the culture of this valuable crop from ſpreading or becoming ſo general as one could wiſh.

Every one ſees the neceſſity of ſome contrivance to remedy theſe evils, but no one ever yet ſtruck out a plauſible plan, ſome farmers indeed would carry the turnip crop off and eat it upon graſs ground, but this is attended with great labour and expence, beſides cutting and ſpoiling the ground, and as the ſaying is, robbing Peter to pay Paul, as it certainly hurts the turnip ground to carry the crop off.

It was ſuch material conſiderations as theſe, which firſt put me upon the ſtudy if poſſible to find out a remedy for ſuch evils, and I flatter myſelf that I have accompliſhed my deſign, by the invention of a moveable houſe, which not only anſwers all the ends of keeping the cattle dry and clean, and of ſaving the turnips, &c. but is alſo of a ſimple conſtruction and comes cheap to the purchaſer, which are very material conſiderations in any new invention, for the higher the price, and the more complicated the machine is, the lower is its value or utility to the public.

Theſe are the grand points which every inventor ought to keep in view, for tho' the invention be ever ſo ingenious, if the conſtruction be ſuch, that none or few but the inventor can work it, or ſo high in price, that the purchaſe will overbalance the utility ariſing therefrom, it cannot be ſaid to be profitable, this is the rock that many new inventions ſplit upon.

I have ſpent much time and ſtudy in new ſchemes, and I always found more labour in reducing them to a cheap and ſimple conſtruction, than in any other part of the invention.

The ſheep-houſe is ſixteen feet one way, by twelve the other; it is all made of deal, has no floor in it, has a rack and manger, the rack is filled with turnips, &c. at the outſide of the houſe.

The ſtaves that the ſheep eat through, ſtand plum, ſo conſequently the ſlope which gives room for the turnips, projects to the out-ſide of the houſe,

Under the rack is a manger fixed, which goes cloſe to the bottom, and only conſiſts of one deal board, ſix inches broad, one thick, and ſixteen feet long, as it goes all the breadth of the houſe ; one of the edges is ſloped, or made feather-edged, ſo as to nail to the bottom of the rack, by this it forms a ſort of triangular trough, going narrow at the bottom.

The rack being filled with turnips, any that are large, ſtick in the top thereof, and as the ſheep eats them they grow ſmaller, ſo conſequently drops lower and lower, till they be ſmall enough to drop through the ſtaves into the manger, which catches every bit, ſo that none need be waſted.

The rack-ſtaves are three feet long, and are fixed into the two rails, one for the top, and the other for the bottom of the rack, in order to ſave a multiplicity of timber. And in order to cut it to the beſt advantage, buy one plank ſixteen feet long by three inches thick and twelve broad.

This will cut into four ſcantlings, each about three inches ſquare; theſe are all that are wanted for the frame of the two ends of the houſe.

It is to be obſerved the houſe is four feet broader than it is long.

Two of theſe ſcantlings are for the fore part of the houſe, and the other two for the hind part.

The rack and manger are fixed in the end of the houſe that goes foremoſt; one of the rails or ſcantlings are tenoned into a ſtandard at each end, and which both ſerves for a platform, the bottom of the rack, and a ſide or back part of the manger, becauſe the rack ſtaves go into it.

They are three feet long, and are fixed into the other rail, which is the top of the rack, and alſo tenoned at each end three feet high into the ſame ſtandards that the bottom rail is tenoned.

The ſcantlings for the ſide of the houſe are three inches ſquare, and twelve feet long; there is only one at each ſide for a platform, and which are tenoned into each end of the ſixteen feet rails which go acroſs the houſe.

The houſe is built ſhed-wiſe, the fore part over the rack end of the houſe is ſix feet, and the hind part is four feet high, therefore the ſhed or fall for water is two feet only.

The poſts or upright ſtandards, which are to ſupport the roof, and to which the boards are nailed round the ſides of the houſe, are only two inches ſquare.

There are five tenoned into the platform, or ſixteen feet ſcantling at the hind part of the houſe, one at each corner, and three at equal diſtances between.

The two corner uprights, into which the two long ſcantlings for the rack and manger are tenoned, are ſix feet high.

Between theſe are three more, of three feet long, each tenoned at equal diſtances, into the topmoſt rail of the rack.

Theſe ten ſtandards, being five before and five behind, are oppoſite each other, and they muſt ſupport the roof of the houſe.

Five ſpars are joined by mortiſe and tendon to the top of the ſaid ſtandards, each ſpar is twelve feet long, to go the length of the houſe, and on which the covering boards are nailed.

At each ſide of the houſe are three ſtandards to nail the ſide boards on, ſo that the whole number of ſtandards round the houſe are ſixteen, the number of ſcantlings or rails ſix, and the number of ſpars five, which being all joined together as above, form the ſkeleton of the houſe, and what remains is to incloſe it with thin boards at three to an inch.

That is, an inch deal board muſt be ſlit into three, which is thick enough either for covering or ſides, as the thinner they are, the longer they will keep from rotting, becauſe the wind acts in a double capacity of drying from both ſides.

The top of the houſe muſt be painted with tar and brown oker mixed, in order to preſerve the wood, and ſhoot off the water.

The covering boards muſt only be nailed in the upper edge in the nature of a ſlate; this will give them liberty to dry in or expand themſelves when wet or dry, without cracking or opening with the ſun or wind, whereas if they were nailed with more nails than one in the breadth of the board, the nails would not give way or yield to the change of weather, therefore there muſt inevitably be an opening between each nail.

In order to prevent the boards from riſing, or blowing off with the wind, you muſt cut a twelve feet inch deal into five rods, almoſt like tyling laths; you muſt ſtretch one of theſe acroſs the boards oppoſite to each ſpar, and thereto nail them with twelve-penny nails, obſerving only to put one nail into each board at the upper edge, alſo cloſe by the firſt nail that faſtens the board on.

Theſe laths keep the boards firm and cloſe, and at the ſame time gives them liberty to play and expand themſelves backwards and forwards, and yield to the weather as it requires, by which means the boards will never crack or open.

The boards muſt lap over about two inches at leaſt, particularly if they be green when put on, as they will run in ſurpriſingly in a hot day.

The houſe muſt be ſo contrived as to take into eight parts; none of the nails muſt be drawn, or the boards taken off ſeparately, but the tenon and mortiſe at each corner muſt be made to draw, by which the two ſhort ſides are two pieces, the rack and manger are another; the other long ſide where the door is, is another,

ther, and the door is taken off, as it is only hung by two ſmall cords at the upper ſides, ſo fall cloſe at the inſide of the houſe.

The covering of the houſe is taken into four pieces.

The houſe runs upon four caſtors, like thoſe of a bed.

Two of the caſtors are fixed under the frame at the two hind corners, and the other two are fixed about nine feet diſtant from them under each of the ſides towards the rack.

When it is filled with turnips, it brings down that end to the ground, ſo that by once trying what weight of turnips it takes to bring down the ſaid end, for the future you only have to fill the rack till the end come down, and by a piece of chalk, ſet each rack full down on the houſe ſide, by this you can eaſily tell what weight the ſheep eats from a day to a month, and ſo on.

Likewiſe what weight each acre will produce.

A little trouble and conſideration will ſhew you at what diſtance from the rack to fix the balancing caſtors, as they are to act in the nature of a center in a ſcale beam, and the longeſt end of the houſe from theſe caſtors is to be equivalent to the weight of turnips put into the rack.

It is neceſſary to have the ſaid two caſtors that act as a center for the balance a little higher than the two hindmoſt caſtors, in order to make the fore-part of the houſe cock up about ſix inches from the ground.

The houſe always ſtands upon two deal boards, and having two moveable deals, in order to lay before or at the end of theſe two, you draw the houſe forward upon them, ſo by bringing the hindmoſt forward, you may eaſily move the houſes any where, for by going behind to puſh it on, the ſheep will naturally fly from you, therefore be no hindrance; and as the caſtors always run upon the boards, they are ſo light a draught that a boy may move them with eaſe.

By having the moveable boards ſixteen feet and a half long, every time they are ſhifted, you meaſure a ſquare perch of ground, and as there are an hundred and ſixty perch in an acre, and as each houſe will hold twenty ſheep, you may bring yourſelf to a regular mathematical rule to know how much weight of turnips each perch produces, and how long they will ſerve ſuch a number of ſheep.

And all is done without any more trouble than making a chalk every time you move the houſe, and another chalk every time you fill the rack.

The rack end of the houſe always goes foremoſt towards the ſtanding turnips.

You pull the turnips as far as you can reach, and fill the rack, then puſh forward the houſe to a freſh piece; as you pull up the turnips with one hand, you muſt in the other have a whiſp of ſtiff wheat ſtraw, cut in the nature of a bruſh, to take off any dirt that may be on the under ſide of the turnip, this is almoſt as eaſily done as let alone, as it keeps the manger clear from dirt.

The labour of taking the turnips by the top, and throwing them into the rack, (having it always beſide you) is no more than the preſent cuſtom of hacking up the ſhells.

It is to be obſerved, that ſheep are not the better for being kept over cloſe, therefore have a place to open at the ſhelter ſide of the houſe to let in air.

The fore part of the houſe, between the top of the rack and the roof, muſt be incloſed by a hanging door with cords inſtead of hinges, it muſt fall againſt the upper part of the rack.

In fine weather it may be taken off, or turned up occaſionally.

In the hind part of the houſe, there is alſo a ſpace of one foot between the upper rail and the roof, which muſt be left open, except a ſtorm comes in that quarter, then it may be incloſed with a deal board, hung with a cord inſtead of hinges.

You need not be over nice in joining or lapping the boards over, when nailed on the ſide of the houſe, it is not the worſe if there be creviſes to let in air or light.

There muſt be a deal board over the top of the rack, by the way of a lid, to keep out ſnow, &c. Each houſe will hold twenty ſheep, and give room enough to feed and walk about.

The above is as conciſe a deſcription as I can give to make a ſheep-houſe, and there is nothing differs from that of a ſtable or ox-houſe, except the height thereof, and the ſize of the timber.

The width and breadth of either ſtable or ox-houſe muſt be the ſame as the ſheep-houſe, viz. ſixteen feet by twelve feet, which is ſufficient for three horſes or four oxen.

The fore part of the houſe where the rack is, muſt be eight feet, and the hind part ſix feet high, this gives a ſhed of two feet.

The boards round the ſides muſt be half an inch thick, but thoſe that cover the houſe only three to an inch, the ſame as for the ſheep-houſe.

The boards round the ſides muſt be nailed at the inſide of the ſtandards, which will prevent the nails from drawing when cattle rubs againſt them.

The ſcantlings which compoſe the frame of the houſe muſt be three inches thick, by four deep.

The bottom of the rack muſt ſtand two feet from the ground, therefore three ſcantlings muſt go acroſs the houſe, viz. one at the bottom for a ſole, and one at the bottom, and another at the top of the rack.

All the ſtandards being ſixteen, which go round the houſe, to nail the ſide-boards to, and to ſupport the roof, muſt be three inches ſquare, but the ſpars only two inches ſquare, the ſame as thoſe for the ſheep houſe, as they have no more weight to bear.

The door muſt be hung with hinges.

Theſe houſes being heavier than the ſheep-houſes, the caſtors that ſupport them muſt be ſtronger in proportion.

The manger will take two boards, each ſixteen feet long, by one inch thick and ten inches broad.

A ridge-board ſixteen feet long, ten inches broad, and one thick, muſt go acroſs the middle of the houſe, and ſupport the middle of the ſpars; in order to ſtrengthen them, it muſt ſtand edgewiſe, and be notched into the middle ſtandard at each end.

The houſe running upon light principles may be moved by one man.

A TABLE

Shewing the Expence of a Sheep-House, as it ſtands in my Book of Experiments, and as Fir Timber now rates in York, being from 11d. to 13d. a ſolid Foot, and ſo in Proportion for Deal Boards.

When timber is cut into thin deal boards, for covering and incloſing theſe houſes, it is neceſſary to uſe a thin frame ſaw for the purpoſe, in order to ſave timber.

	l.	s.	d.
To twelve boards, each twelve feet long, by one inch thick, at 15d. per board - - -	0	15	0
To ſawing two cuts in each, at 2d. a cut - - - - - -	0	2	0
To three planks, ſixteen feet long each, by three inches thick	0	13	6
To ſawing three flat cuts in one of ſaid planks for rails - - - -	0	0	3
To ſawing two deep cuts in the other two, taking an inch board off from each, which will make the ridge-board, manger, and a lid for the rack, the two cuts - - - - - -	0	0	6
To ſawing flat cuts in the remaining two inch boards, in order to reduce them two inches ſquare for ſtandards and ſpars, &c. - - - - - -	0	0	8
To timber and ſawing for rack-ſtaves - - - - - - - - -	0	3	3
To four bed caſtors - - - -	0	1	8
	1	16	10

	l.	s.	d.
Brought over - -	1	16	10
To a man three days to build the house - - - -	0	6	0
To two hundred of four-penny nails - - - - -	0	0	6
To one hundred of twelve-penny nails - - - - -	0	0	10
To pitch, tar, and brown paper,	0	6	0
as covering for the houses -	0	6	0
To boards for the house to run upon - - - -	0	2	9
	2	12	11

These houses are much cheaper than common ſheep-pens, conſidering how long they will laſt, and what yet adds to their value is, that one may proportion the houſes, to the number of ſheep; ſuppoſe you have twenty ſheep you only need one houſe, whereas, if you have only twenty ſheep in the common method, you muſt have as many pens or bars as would do for a hundred.

The expence of a ſtable for three horſes or four oxen, will only come to between four and five guineas, in any part of England where timber is the deareſt.

CHAP. VI.

Shewing the great Utility of the MOVING HOUSES, were they brought into general Uſe, for all Sorts of Cattle.

WAS my reader to well conſider the immenſe quantities of manure he loſes by the preſent method of houſing the cattle, he would let nothing prevent him from making uſe of moving-houſes.

It is liquid manure, I mean the urine of cattle, which none of the Engliſh farmers pay any regard to.

In Germany the farmers make more uſe of liquid, than any other manure;

which experience and their crops tell them that they are right.

They do not loſe the leaſt urine from the cattle while they are in the houſe.

They alſo convert little-houſe dung into liquid manure, and bring it in caſks many miles; they buy it by the gallon at a very high price, and put it together in a pit or reſervoir, and keep it ready for uſe, and eſteem it the better for age; they alſo take care to have cloſe covers to theſe liquid pits, to prevent the ſun from exhaling the ſpirits therefrom.

Reaſon proves beyond a contradiction that they are right in all this, and if ſo, our Engliſh Farmers would do well to copy of them, and to pay due regard to ſuch manure.

Moſt ſorts of Cattle, ſuch as horſes, hogs, cows, or ſheep, evacuate much more weight by urine than by dung, and the ſame weight of urine will produce much the greateſt quantity of ſalts, which are what muſt feed the crops.

When turnips are eat on the ground with ſheep in the moving houſes, the land gets all an equal dreſſing, as the ſheep are confined juſt as long on each part as they are in conſuming the crop that grew thereon.

But when at liberty, they upon every cold blaſt or ſhower of rain run together under a hedge, or any little ſhelter they can find, and remain there till they over manure it, though other parts may want.

Perhaps ſome of my readers may not conſider the thing right, and may imagine that twenty ſheep being confined on one perch of ground, may tread it to dirt.

But this is not the caſe, becauſe they are no longer confined than whilſt they eat the turnips that grew thereon, and this they muſt do, be they confined in what other fencing you pleaſe, only with this difference, that they will make more feetings by running backwards and forwards to take a bite out of each turnip, than they would do by eating them out of a clean rack and manger.

But what makes dirt in the common way of eating them is, when a freſh break being opened, the ſheep immediately traverſe it all over, and trample it full of holes, which the firſt ſhower of rain fills with water; therefore when the ſheep goes again over it, the ground is made immediately into mortar, ſo conſequently the ſheep are retarded from feeding, and a great part of the turnips waſted, by being trod and tumbled about in the dirt.

But in the houſes this is all prevented as not the leaſt rain falls upon the ground after the ſheep comes on it till they leave it again.

And the ground being whole or untrod when they come upon it, they cannot tread it to dirt, for the more they tread, the dryer and firmer it will be.

They only lie one night on the ſame ground, neither do they ſtand half ſo thick on the ground as they do in the common method of folding.

The turnips being pulled and thrown into the rack, the ſheep eats them while they are green, freſh, and retain all their juices, but in the common method, ſuppoſe the ground be dry and ſandy, yet the ſhells become dry, and loſe a great deal of their ſubſtance.

Any farmer who contrives to make the beſt of his crop, will eat the turnip tops with lean ſheep, either ewes or hogrils, becauſe they are not of ſo feeding a quality as the bottoms, being full of a ſharp acid quality, which ſcowers fat ſheep, and retards their feeding.

Some farmers in Lincolnſhire buy old ewes, and draw out their fore-teeth, and turn them among their turnips to eat the tops, without ever touching the bottoms.

This method, though a barbarous one, ſhews an œconomy, and leaves profit too, if properly managed.

But ſuppoſe the ſtock be too large for the tops to feed them, there may be a loſs attending it, as they can eat nothing elſe to finiſh the fattening.

Now all this is provided againſt in the houſes, becauſe every ſecond or third houſe may be allotted for lean ſheep, and the tops cut off and given to them.

This may be done with little trouble, by having a ſcythe point, or the like, faſtened in the corner of every houſe, and a baſket placed under it, for the tops to drop into when cut off; and as the houſes are all of a row, and cloſe together, they have only a few ſtrides to carry the tops and throw them into the rack to the lean ſheep.

A few turnips may be given now and then to the lean ſheep for change of diet.

The ſame œconomy may be uſed in regard to horned cattle fed with turnips, for the tops may he given to cows, calves, or any ſort of lean cattle, and the bottoms to fat cattle, with the like ſucceſs as in ſheep.

If horned cattle be put into theſe houſes, they muſt be tyed to the bottom of the rack by a halter that goes round their horns; and either ſheep or cattle that are fed in theſe, when put in, muſt not be let out again ſo long as they are at turnips, neither muſt they have any water, the juice of turnips provides abundantly in this way.

Any cattle or ſheep, that are fed upon turnips ſhould have a little hay put into the rack every day; in order to clean their mouths, and give them a freſh appetite for turnips.

It might be very proper, for any perſon who has cattle feeding upon turnips, to provide himſelf with a hay-houſe, made upon the ſame plan; only, inſtead of being ſixteen feet by twelve, he need only have it twelve feet ſquare, and no rack and manger; the ſaving of theſe will do more than pay for ſix ſcantlings or bearers, for the hay to lie upon.

Three twelve feet deal-boards, one inch thick each, ſplit in two by a flat cut, and each ſcantling ſet up edgewiſe, ſtretching from one ſide of the houſe to another, will be ſtrength ſufficient to bear a load of hay, which is enough to put into the houſe at a time.

We ſee the many and great advantages that attend theſe houſes, in point of turnips; but their utility does not end here; it extends alſo to graſs-ground.

They are very uſeful for field-ſtables; it being much better, to have a moveable ſtable, that can be ſhifted at pleaſure, to a clean and poor part of the field, than, as is uſual, to have them ſtand always in a place, whereto the cattle reſort, and not only break the ſurface, and tread the ground to mortar, but with their urine enriches it more than needs, whilſt other parts want it.

Dung, indeed, may be gathered up, and ſpread elſewhere; but urine, when waſtefully dropped, cannot be recovered.

I hope to ſee the time in England, that due regard will be paid to the liquid manure, and that farmers will have no other but moving cow-houſes and ſtables, to expend all their winter-fodder in.

Was this the caſe, they might manure double the quantity of ground with the ſame number of cattle, and alſo keep more cattle with the ſame quantity of fodder too, as none will be waſted, neither need they any litter or bedding, for being moved twice a day, viz. every night and morning on a clean freſh piece of graſs, they would lie very clean and dry.

What a great piece of graſs ground might a farmer manure in a winter, with ten or a dozen of theſe houſes, going on a breaſt up a field.

But was this ever to be the caſe, care muſt be taken not to ſpread the dung on the places where the cattle ſtalled: as that would be rich enough without it.

Each houſe would manure well, without any other aſſiſtance than what went through the body of the cattle, two acres in the winter half-year.

Such houſes as are made for winter-uſe, may be converted into hog-houſes in ſummer; and are very valuable to any one who keeps hogs to feed on clover, or any other ſour graſs; becauſe the hogs can be confined on a place, till they eat it bare, and then ſhifted on to freſh.

By the clover not being trod or tumbled on, it will go the farther; and tho' the hogs are ſafely confined, (being a miſchievous creature) yet they will thrive well.

Beſides, there is no one who has cattle in ſummer paſtures, but what has many rank places therein, which produce long ſour graſs, that the cattle will not eat, and which is the moſt proper for hogs; therefore, if a parcel of hogs be put into one of theſe houſes, and the houſe run over ſuch places; by that means you convert what before was of no uſe into real profit.

So that, in ſhort, tho' theſe houſes are cheap and ſimple, yet their utility may be immenſe, if brought into general practice.

As carrots and cabbage are excellent winter-feeding, and are likely to gain footing in the world, by ingenious and ſpirited cultivators, theſe houſes may alſo be of infinite ſervice in feeding cattle on the ground therewith; as in the caſe of turnips.

CHAP. VII.

On the Management of TURNIPS, and their Perfection.

TURNIPS are a crop that deſerves the huſbandman's attention, perhaps as much, if not more than any one he can cultivate, particularly for winter-feeding for cattle; as may appear by a table hereunto annexed.

Their general uſe, as food for cattle, is not of very old ſtanding in England; tho' more ſo than cabbage or carrots; but, in fact, every vegetable of the ſort has made a quick advance within the ſpace of a few years.

If we look back, we ſhall find that, not longer than two centuries ago, we had no greens or roots for the table, but what were imported from the Netherlands.

The people, in thoſe days, imagined the climate of England would not produce garden-ſtuff; but were they to ariſe again, and take a view now, they would be ſurpriſed at the progreſs we have made therein; as perhaps we may now go near to rival the world in that point; tho' yet far ſhort of being at the height of improvement in it; as new diſcoveries are making every day.

The county of Norfolk is more forward in turnip-huſbandry than any other part of England; it is their capital piece of ſarming, in which they take great pains, and certainly do excel.

Their land is very proper for the crop, being chiefly inclined to ſand; therefore the cattle are not abuſed, nor the turnips waſted in dirt, by feeding off; which is one of the firſt conſiderations belonging to a turnip-crop.

I have ſeen both clay and laom produce heavier crops of turnips than I ever ſaw in Norfolk, and with leſs labour too; but then the queſtion was, How to eat them off? This is the rock they ſplit upon, as one half perhaps was waſted in the dirt; neither do the cattle thrive ſo well, or feed ſo faſt in ſuch a diſagreeable dirty ſituation. It is that which deters farmers from entering heartily into the ſpirit of the crop; and not ſo much the want of knowledge how to raiſe it.

That being ſimple and eaſy; as turnips are far from being a tender plant.

But I hope the moving houſes will put an end to theſe difficulties, and that farmers will cultivate this valuable crop on every ſort of land, and every part of the kingdom too; as there are none but what will produce them, if properly managed.

In 1748, I raiſed in Ireland, upon ſtrong clay-land, thirty acres of turnips, that upon an average, weighed thirty-nine tons per acre; but ſome of the beſt part of the field was weighed, and proved to produce fifty-three tons per acre.

But the land was ſo clayey and wet, that no cattle could go on it, to eat them; ſo that I was obliged to carry them all off in hampers, on horſe-back, which made it very expenſive and troubleſome, not being then acquainted with the moving ſheep-houſe.

The Norfolk-farmers raiſe all their turnips after fallow; they give three, four, and ſometimes five plowings.

They generally dung for turnips; therefore by the fallow, well dunging, and two or three hand-hoeings, they may well expect a good crop; yet they often loſe them by the fly, and ſometimes have their land to ſow two or three times over.

The beſt farmers will begin to hoe, when the turnips are very young, perhaps not above an inch high.

In this they are certainly right; becauſe if they be ſuffered to grow thick at firſt, they draw one another up tall and weak; in which caſe they get a bad turn in appling; but if thinned early, the tops ſpread along the ground, and they apple more kindly.

For their firſt hoeing, their general price is three ſhillings per acre, and the ſecond two ſhillings per acre.

When they ſell a crop, their medium-price is about forty-five ſhillings per acre;

which is but low. But this is chiefly owing to plenty, as every one is in the branch.

Their weight of turnips, per acre, from thirty to forty tons.

The crops vary leſs in quality, than in any other part of the kingdom, owing chiefly to their regular courſe of huſbandry, as every one ſollows it without varying.

After turnips they ſow barley, and ſeldom fail of a good crop, which runs from four to five quarters per acre.

After barley, clover and rye-graſs, by them called white none-ſuch; but this is the rock they ſplit upon, and which they all feel and complain of, but cannot find a remedy for, as they do not comprehend from whence the evil ariſes; and ſince I am on the ſubject, I beg leave to enlarge a little thereon.

The general complaint, among all the ſarmers through Norfolk, is, that their land is tired of clover; that is, their clover-crops are not ſo good as they formerly were; that it wears out, grows thin, and even all dies away in places.

This complaint is not more general than true; which my eyes can witneſs; for I have viewed clover moſtly all over the county, and generally found it thin, and, in ſpots, all gone away; particularly when it grows near mowing time; though at the beginning of the year, it ſhall flouriſh amain.

But I muſt make another obſervation, and that is, that I do not remember, through the whole county, ever to have ſeen a piece of clover without rye-graſs amongſt it, either more or leſs.

And I obſerved alſo that, wherever the rye-graſs was moſt predominant, the clover was weak and ſickly; and where the clover was moſt predominant, the rye-graſs was weak; but the latter was ſeldom the caſe, which may be compared to two men ſtruggling; the one, a ſtout, hardy mountaineer, and the other, a frothy, tender, delicate man, who muſt give way to him that is of a more hardy, robuſt conſtitution. This is juſt the caſe, as it ſtands between the two graſſes.

The roots of them both are large and fibrous, and run horizontally, and therefore feed in the ſame latitude, or among the ſame particles of earth, and of the ſame ſubſtance.

But the root of the rye-graſs is by much of the ſtrongeſt, tougheſt, hardeſt texture; it is longer in eſtabliſhing itſelf on the ground; as is evident, becauſe the clover flouriſhes moſt when young; but within the courſe of a few months, when the rye-graſs has got eſtabliſhed, its own roots fill the ground, and bid defiance to all the oppoſition clover can make; and by mere ſtrength of nature, they force it to yield; which it does, and dies away inſenſibly.

This puts me in mind of many arguments which I have heard the Norfolk farmers endeavour to ſupport, in vindication of this great piece of miſtaken huſbandry, viz.

That, as clover has a ſoft, frem, tender root, and rye-graſs a hard, tough one, they do not both feed upon the ſame ſubſtance, though among the ſame mold; therefore are not improper to ſow together: with ſuch like weak arguments, that are ſcarce worth anſwering.

It is evident, that innumerable different ſpecies feed upon, and are ſupported by the ſame food, both in the vegetable and animal creation: though in their appearance and nature, they are quite different.

An aſh-tree is quite different, in nature and aſpect, from corn or graſs; yet it feeds upon the ſame ſubſtance; for, ſo far as the roots reach, they take in all the ſubſtance of what ſhould feed the more dwarſy crop; as appears by the aſpect of ſuch crop, when growing under it.

Human ſpecies and dogs feed upon the ſame food; yet I need not ſay how different in nature.

A horſe and a gooſe both feed upon graſs and corn; yet the former is not covered with feathers, no more than the latter with hair; every thing muſt bear in nature and reſemblance, what their creator firſt gave them; it is not poſſible for all the art of man to change it.

May not a child from one ſtone weight, be fed upon nothing but fowls, till he be a man of twenty ſtone weight; ſo that one would think there was nothing but fowl in his compoſition? Yet it makes no alteration.

All this proves that clover and rye-graſs, tho' very different in nature, may feed upon the ſame food.

And reaſon tells us, that, if there ſhould not be food or room ſufficient for both to ſubſiſt on, the weakeſt muſt go to the wall; as the phraſe is.

And both occular demonſtration, and experience may prove to the Norfolk-farmers, that clover is not able to withſtand the reſolute, robuſt attacks of the rye-graſs.

Rye-graſs is, to clover, a very weed, a ſort of ſcutch-graſs or quicks, the worſt of all weeds; and ought to be eradicated, not only from among clover, but from among all other crops; being very pernicious thereto, as well as impoveriſhing to the ground.

The Norfolk-farmers admit that it runs, or fills the ground full of ſcutch-graſs; which is ſaying as much as need, to prove it an enemy to the farmer's intereſt.

Indeed, if ſown alone, it can only hurt the land; therefore the conſequence is not ſo great, as when it both preys upon land, and deſtroys a crop of clover that is in every degree far ſuperior to itſelf.

If you tell the Norfolk-farmers, that the evil they complain of is occaſioned by the rye-graſs being ſown among the clover, as aforeſaid; they will immediately tell you, no; that cannot be; for, ſay they, we only ſow it thin, perhaps not more than one buſhel on an acre; whereas we uſed formerly to ſow three or four on an acre.

This is a ſort of contradiction in itſelf: for if they did not ſuſpect that it hurt clover, why ſhould they leſſen their former quantity? Therefore, it is plain, experience taught them this.

However, inſtead of lowering, they are heightening the evil, becauſe the thinner we ſow any ſort of grain, the more it ſpreads in root, and eſtabliſhes itſelf more firmly in the ground.

It is not much above twenty years ago, ſince rye-graſs became general in Norfolk; in thoſe days, their clover-crops were good, and would laſt two or three years; but now they will ſcarce ſtand one.

Their courſe of huſbandry is, to plow up their clover and rye-graſs-ſtubble, when the ſheep have eat it bare, or that it is mown about Midſummer. They then give it two or three plowings, and ſow it with either wheat or rye.

When the crop is off, they fallow the land, for a turnip-crop.

After turnips they ſow barley, and amongſt it clover and rye-graſs; ſo that between the graſſes being plowed up, and ſown again, there is only about thirty-one months; in which time there is a crop of wheat, a crop of turnips, and a fallow for each.

The graſs-ſeeds are ſown along with the barley; ſo conſequently begin to grow, and to take on land at the ſame time.

I muſt own, were they to omit rye-graſs, and ſtick to clover, their method of huſbandry would be excellent; becauſe their land is always in profit, or elſe in tillage; and that, without loſing a year's rent by fallow.

What makes them ſo fond of rye-graſs, is, becauſe of its early ſpring-growth for ewes and lambs.

Indeed, every farmer would do well, to adapt a few acres for this purpoſe, ſown with rye-graſs alone; and let it lie as graſs-land, for ſix or eight years; here he would gain his ends, without hurting any other land or crop.

However, it muſt be confeſſed, the Norfolk-people are the beſt turnip-farmers in England, to take them in general.

Indeed, the labour of hand-hoeing comes cheaper to them than in any other part of England; owing to the labourers being much accuſtomed thereto.

A man will hoe half an acre in a day, the ſecond hoeing, with eaſe; which is a trifling expence, in compariſon of what it coſts in other parts of the kingdom, where people are entire ſtrangers to that branch.

If land be inclined to weeds, hoeing is abſolutely neceſſary; as it anſwers the end in a three-fold capacity, viz.

In deſtroying the weeds, and improving both the land and turnips; and they are great ſlovens that neglect it, and deſerve to be pointed out and laughed at by every one.

There is no land but what will throw up weeds, except trenched land; and though this may do better than any other without hoeing, yet the labour here alſo would not be thrown away.

The improvement which the land would receive, by ſtirring and opening the mold, to let the ſalts of the air thereamong; and by thinning the turnips, to encourage their growth, would more than doubly pay the expence.

As far as I have tried trenched ground with turnips, (and one may tell by a little matter what would be the caſe in a great one) it is far preferable to any other tillage; which I ſuppoſe is owing to the ſtaple of the ground being deep.

The manure that lies at the bottom thereof encourages the tap-roots to ſtrike downwards, and ſeed thereamong.

Though the body of the turnip lies above ground, yet it is chiefly fed by the tap-root, which runs perpendicular, to a conſiderable depth; and the beſt turnips have generally only one root; and that long and ſmall, with only a few ſmall fibres branching therefrom.

The next obſervation is, that any tap-rooted plant, (ſuch as carrots, parſnips, or turnips) ſtrikes deeper, and has a better root in a ground that is pretty cloſe and firm, than when the land is too light and open.

In ſuch they grow forky, having many roots; which is productive of a very bad top.

Every ſenſible gardener will tread ſuch light ground, when the ſeeds are ſown, to prevent the ſaid evil.

This alſo ſhews, that it is alike neceſſary for a farmer to roll his turnips or carrots, as ſoon as ſown, if the land be light, particularly on trenched ground; as that will be more open and light than land that is only plowed one furrow deep.

It is an agreed point, that land for turnips ſhould be well tilled; and that the cleaner it is from weeds, the better.

It is the farmer's intereſt, to ſow ſuch a land with turnips, as is tired with corn; becauſe it undergoes ſeveral operations to improve it.

If ſtubble-land, it ſhould be plowed as ſoon as the crop is off, and be well fallowed all winter, and till ſowing time, which is about Midſummer following.

But thoſe who chuſe to follow my

new method of trench-plowing, will ſave much labour, and be much ſurer of a crop.

My method is, to ſow part of my crop, on, or as near the twenty-fourth of June as poſſible, and another part about three weeks or a month after, and when it is likely for rain, and in an evening.

By dividing your ſowings thus, the crop has not only two chances, but comes in at proper periods, for ſheep to be turned therein, to eat it to the beſt advantage.

The firſt ſown will be ready to turn in about Martinmas; and the laſt ſown may be kept for ſpring feeding.

If you follow the old huſbandry, the quantity of ſeed per acre is one pound; and, in ſowing, take up what ſtays between one finger and thumb, and chuſe a calm evening to ſow it in.

Some will cover the ſeed by buſh-harrowing; but I find it beſt to roll it in, as ſoon as ſown.

Tho' no manure comes amiſs for turnips; yet I never ſaw better crops than from aſhes after burn-beating.

They are fond of aſhes in general, but particularly of thoſe burnt from the ſod.

However, I do not approve the method; except it be a wild, coarſe, deep, ruſhy, or heathy land.

But where the land has a fine ſod, it is bad policy to burn it; becauſe a great deal of the ſubſtance of the land flies into the clouds; and let men argue as they will againſt it, I know, both from reaſon and experience, that it hurts land for the future.

It is a moſt vile cuſtom, to burn ſuch kindly, fine graſs-land, as I ſee is burnt in ſome parts of England; certainly no man would do it, were he to conſult reaſon,

ſon, and look two or three years before him, and ſee what would be the conſequence.

It is true, he may be ſure of a crop by this method; and ſo might he by a good fallow, which would improve rather than hurt the ground.

If the ſod or graſs-roots be reduced to manure in the ground, either by fallow or trench-plowing, in ſuch a caſe it leaves a laſting ſubſtance therein.

But in moſt ſorts of land, when burned, nine-tenths of the ſubſtance ariſe into the firmament; for lay a ton of ſods together, and, when burned, they ſhall be reduced to two hundred weight of aſhes.

Let not any man deceive himſelf, by believing that all the manure ſtays in the aſhes; for that it does not.

There are ſeveral ſorts of enriching qualities in the earth; but for brevity-ſake, I ſhall only mention two, viz.

Acid ſalts, and oily ſalts; the former are of a more ponderous nature than the latter; therefore, while the fire is reducing, or rather ſeparating the groſſer particles of the earth from theſe manures, ſome of the heavieſt ſalts remain among the aſhes.

But the oily ſalts, which in fact are the richeſt and ſmootheſt food for plants, evaporate with the ſmoke.

We may know this by ſoot; for one buſhel, taken from a chimney, will go as far, for manure, as twenty buſhels of aſhes taken from the hearth; and yet they are both rarified, or divided from the ſame fire, and from the ſame groſs materials.

Therefore, let us only conceive what a miſtake farmers lie under, who raiſe manure by fire; I ſaid before, that they ſend nine-tenths into the clouds, but I believe it is much more; for I remember ſeeing a hay-ſtack burned, that contained a hundred and twenty loads of hay, the aſhes, of which were not more than what would manure half an acre of land; whereas if the ſaid hay had been reduced to dung by putrefaction, it would perhaps have manured twenty times the quantity.

In ſhort, every combuſtible matter is very full of oily ſalts; it is thoſe that make it burn; and all ſuch matters leave very little ſubſtance behind them; they aſcend into the firmament, and are aſſiſting to compoſe the clouds that we ſee floating over our heads.

The turnips being ſown, the next conſideration is, the proper time for hoeing them.

In this, as in moſt other things, people differ in opinion; ſome will hoe them when very young; ſome when half-grown, perhaps; and others condemn that practice altogether, and will not hoe at all.

He that hoes them when young, has the advantage of all the reſt, becauſe the tops being ſmall, the work is more quickly and ſafely performed; for, when the leaves are large, and hang over, or cover the ground, it takes up a great deal more time, to look out and divide the beſt plants; and as they are hid with leaves, except great care be taken, the hoe may reach to, cut, or wound plants one would wiſh to preſerve.

He that will not hoe at all, is ſtill worſe, for then he not only lets the turnips ſmother one another, if ſown thick, but permits weeds to grow, to aſſiſt in deſtroying his crop, and alſo robs his land from a hoeing, which would be of great uſe to it, let the crop be as it will.

CHAP. IX.

On different Sorts of TURNIP-SEED.

THE following is a liſt of various ſorts of turnip-ſeed, that are chiefly in cultivation at this preſent time in England.

Firſt, the large Norfolk-ſheep-turnip. It ſtands the winter well, and grows to a good ſize; the apple or body of the turnip grows all above ground, and has a large top.

Secondly, the early red-top-turnip. This alſo grows large, but does not produce ſo much weight upon an acre as the firſt ſort; which is owing to its flat ſhape.

It has a ſmall top, which is of a darkiſh green colour, nearly approaching to red.

The upper part of the turnip has a reddiſh caſt, a thin ſkin, a handſome ſhape;

and it is a ſweet eating turnip, and the ſureſt of all others for a crop.

I have more than once ſown a mixture of turnip-ſeeds in one field, by which I have proved it to be the ſureſt of all others for a crop.

In ſhort, it is my favourite; but as it is an early turnip, it ought to be eat firſt; and a proportionable quantity of the Norfolk-ſort ſhould be ſown, and kept for ſpring-feeding.

Thirdly, the yellow turnip. This is a ſmall ſort, and is chiefly cultivated by gardeners for the table.

It is a mild-taſted turnip; and the inſide, when boiled, is of a yellowiſh colour; I have ſown it in the field; but its growth is rather dwarfy.

Fourthly, the turnip-cabbage. This is a ſpecies of the turnip-kind, that has not long been in vogue; it has the two names of turnip and cabbage, becauſe it reſembles both.

The turnip is in colour like a cabbage-ſtalk, and in ſhape like a nine-pin, (for it ſwells in the middle to that form) between the leaf and the ground, and if well grown, is much about the ſize of one; but the leaf or top is much like that of a cabbage; yet it never turns to one, but always keeps ſpread and open, like cole-ſeed. (See the chapter on turnip-cabbage.)

Fifthly, the turnip-rooted cabbage.

I am much at a loſs to find out from whence, or why the name of cabbage ſhould be added to that of the turnip; ſince no part of the plant has any reſemblance to a cabbage.

It is nothing elſe but a turnip, in every ſenſe of the word; and if any one who has a turnip-field will look it carefully over, he moſt likely will find many of theſe plants among his common turnips.

They are known by what is called a bad appling turnip, or one that does not turn well, and I have many a time weeded them out of my crop, as being of an inferior ſort; and this has been moſtly the caſe with all farmers.

I always looked upon ſuch plants to be the ſport of fortune or chance, rather than of nature; however, I am rather inclined to think, that both nature and chance are concerned in giving them an unkindly turn.

Becauſe I have ſorted the ſeed, and ſown it ſeparate, and found that it moſtly produced turnips of the ſame ſhape, though not altogether ſo; for by the great chance, that we find a bad-turned or parſnip-like turnip grow among ſeed that has been carefully tranſplanted, and ſaved from turnips which were of a handſome, round, and flattiſh ſhape, (for of ſuch, choice is always made for ſeed) by the ſame chance, I ſay, we may find a handſome well-turned turnip among this bad-turned kind.

Tho' no ingenuity can change the nature firſt given by its Creator, yet experience tells us that we can both help and deform nature.

Help it, by always preſerving ſeed from the moſt beautiful kind; or, on the other hand deform it, by making a contrary choice; and tho' I am apt to believe, that what is called the turnip-rooted cabbage is no more than a deformed turnip, and the ſaid deformity kept ſeparate and improved upon; yet, as it is a point that cannot be abſolutely determined, but there will always be room to give plauſible reaſons to the contrary, I ſhall not be too ſanguine in my aſſertions, but juſt deſcribe the turnip as it grows.

The turnip-rooted cabbage is of a longiſh ſhape, almoſt like a nine-pin, but not ſo thick in the middle, and has a large tap-root, which ſtrikes deep; and the body of the turnip is almoſt buried under ground, like a parſnip.

Its top and leaves are like thoſe of a Norfolk-turnip; except that inſtead of all the top growing out of the crown of the turnip, little ones grow out round, at a diſtance from the crown. It keeps green or growing all winter; becauſe it is deep in the ground.

In ſhort, one of theſe turnips bears the ſame affinity to the handſome, round, well-turned turnip, as a ſcallion does to a handſome well-turned onion; for, though onion-ſeed be all ſaved from a well turned onion, and ſown on the ſame ground, yet ſome will produce good onions, and ſome ſcallions.

The latter grow with a thick neck, and grow deeper in the ground than onions, and keep growing all winter, in the ſame nature as turnip-rooted cabbages.

Therefore, inſtead of giving them the name of turnip-rooted cabbage, were we to give them that of turnip-ſcallions, we ſhould be perhaps nearer the real thing; as I am apt to think their degeneracy from the real turnip, ariſes from nearly the ſame cauſe, as does that of the ſcallion from the onion.

However, be this as it will, they may be uſeful in their place, as ſpring-food for cattle; as ſcallions are inſtead of ſpring-onions, for the table; but ſhould they be a ſpecies of turnip, different from all others, which I rather doubt, I know that they are ſown in the ſame ſeaſon, and managed in the ſame manner, as the Norfolk-turnip.

The beſt crop I ever ſaw the turnip-rooted cabbage produce, was ſown by a gentleman, three miles from Dublin.

The land was ſown about the firſt of July, in drills, to the amount of about twenty acres in one cloſe.

The land was a good loamy clay, rather inclined to be ſtrong; the rows about eighteen inches aſunder.

They were very carefully hoed with the plow, and thinned to a proper diſtance, by hand-hoeing the length-way of the rows.

The crop was extremely good, and very even, all over the cloſe.

I was by, at weighing a ſquare perch; and, by the moſt exact calculation, the cloſe produced forty-ſix tons and a half, upon an Engliſh acre.

They were kept for ſpring-feeding.

The ſame gentleman had about thirty-five acres of the large Norfolk-turnip, on the ſame ſort of ground, parted only by a fence, and which were managed by the ſame good huſbandry as the former ſort; and the crop was very good.

I alſo was by, at weighing a ſquare-perch of theſe turnips, which produced about fifty one tons on each Engliſh acre; which out-did the turnip-rooted cabbage, by five tons and half each acre, the land was well fallowed, but not manured.

This was a fair trial; and both the crops were brought to the height of perfection.

I have made two trials in England; one upon loamy clay, and the other upon ſand.

The turnip-rooted cabbage produced at the rate of forty-three tons per acre, upon loamy clay; and the red-top turnip forty-nine tons upon an acre.

The ſeed was ſown in the common broad-caſt method, and hand-hoed twice.

The land was wheat-ſtubble, and fallowed from Michaelmas to the time of ſowing; and got eight plowings and two harrowings, but got no ſort of manure.

The turnips, of both ſorts, were ſown at or about Midſummer, and were rolled in, without buſh-harrowing.

My trial upon ſand-land, as well as many other obſervations I have made, proves beyond a doubt, that the turnip-rooted cabbage likes clay, or ſtrong land, beſt.

This experiment ſtands thus:

I ſowed an equal quantity of clover-lay, well fallowed, (the land dry and ſandy) with red-topped, early turnip, and turnip-rooted cabbage-ſeed.

Both the ſeeds were ſown on one day; and both ſteeped in the pickle, as deſcribed in this book.

Though both the ſeaſon of ſowing, and the land were very dry, yet both the ſeeds came up very quickly, and neither of them ſuffered from the fly.

The ſeed was ſown very even, and ſome of it put down grain by grain, at one in the middle of every ſquare-foot; as deſcribed in my new huſbandry.

As the land had been well tilled, it was pretty clear from weeds; therefore it got only one hand-hoeing.

The average-produce, in the turnip-rooted cabbage, was only thirty-one tons per acre; and that of the red-topped, early turnip, was at the rate of ſix and forty tons per acre.

Therefore, I ſay, this, together with other correſponding circumſtances, ſhews that the turnip-rooted cabbage is fonder of ſtrong land, than of that of a light ſandy nature.

A TABLE

Of the Expence and Profit of an ENGLISH Acre of TURNIPS, when eaten on the Ground by Sheep.

	l.	s.	d.
There is no doubt but a tolerable acre of turnips will feed fifteen ſuch weathers as will coſt in autumn twelve pounds a ſcore; and in the common courſe of things, there is likewiſe no doubt but that, when fat, and by the advance of markets, they will give in April, twenty-four pounds a ſcore, which leaves a profit, to the farmer, of - -	9	0	0
If the turnips grow upon fallow, I allow eight plowings; which, if done with one man and two horſes, will be worth two ſhillings and ſix-pence each plowing	1	0	0
	1	0	0

	l.	s.	d.
Brought over	1	0	0
To harrowing, ſowing, and rolling	0	2	0
To ſeed	0	0	6
Attending the ſheep, in ſhifting the houſes, &c.	0	15	0
To market expences	0	10	0
To half a year's intereſt for twelve pounds	0	5	0
To land-rent	0	15	0
Total expence	3	7	6
Clear profit	5	12	6

CHAP. IX.

Remarks and Illuſtrations on the foregoing TABLE, together with the Method of feeding Bullocks, &c.

IT is a common thing with good farmers, to make double the price of their turnip-fed ſheep in April, coſt what they will in autumn; as appears by the foregoing table.

I have given good allowance, in the ſaid table, for all labour or attendance; as I would not leave it in a farmer's power even to think that I would flatter him into any ſcheme, by ſhewing a great profit at the end of a ſum total, without allowing him ſufficiently for his labour, while he is executing the ſame.

Again, I have omitted, in the table, taking notice of the ſheep dunging the land, by eating the turnips; which may juſtly be accounted worth thirty ſhillings an acre; and the fallow is thirty ſhillings more; therefore, we may moderately deem the land three pounds better for this dreſſing; and this too, without the loſs of a fallow-year; alſo a farmer gets the profit of his land in his pocket, in April; and he could not expect it much ſooner, had it been under any ſort of corn. All theſe conſiderations a farmer ought to bear in mind; for if he do not impartially reckon every thing that makes for and againſt himſelf, from the ſeed going into the ground to the money coming into his pocket, he never can be a right judge what ſcheme to purſue for his own advantage.

Feeding bullocks on turnips, is another method practiſed by ſome farmers; but this falls ſhort, in profit, of the ſheep feeding ſcheme; except they be conſumed on the land, in moving houſes; for though bullocks clear double their firſt coſt, and make as much produce out of an acre, yet the expence is greater in attendance, in the old method; for, as they are tied in a houſe, the turnips muſt be carried to them. Every twenty bullocks will take two houſes and two men to attend on them, when thus confined at home.

Again, the land loſes the benefit of the manure, being very conſiderable, in what it would gain by ſheep.

It is true, bullocks make ſome manure; but it is very inconſiderable; as the turnips paſs through them, chiefly by urine.

The bullocks that are fed by turnips, muſt never be watered, nor go out of the houſe, from their firſt being put in, till they go to the butcher; for the turnips ſupply them with water enough; and if they be let at liberty to run or play, it will heat and diſturb their bowels; inſomuch that the turnips will paſs through them too quick, before they have time to fulfil their office by digeſtion.

Some farmers manure their meadow-lands by feeding ſheep upon them with turnips; but though they gain in one place, they loſe in another; and they alſo add a multiplicity of labour and expence thereto, by pulling up and carriage; which they will very ſenſibly feel in fifteen or twenty acres of turnips: however, every one knows his own ſituation beſt. If he be diſtant from dung for his meadows, this method of feeding ſheep upon them will give an excellent dreſſing.

Some feed their cows and dry cattle on their meadows with turnips; but this is a bad way; for the cattle ſpoil and tread the land; neither are turnips a proper feeding for cattle that run about, no more than for a working bullock.

CHAP. X.

On preſerving TURNIPS good for Spring Feeding.

IT has always been a cuſtom among gardeners, when they want to preſerve turnips, carrots, parſnips, &c. good for the table in ſpring, and to keep them from growing, to bury them in dry ſand.

Were we to take a curſory view of this method, without entering thoroughly into the merits of the cauſe, we might think it a very judicious way, and one that might be extended to the preſerving of theſe vegetables good for ſpring-feeding for cattle.

But, if we look more narrowly into this affair, and withal conſult reaſon, we ſhall find, that, inſtead of retarding vegetation by this method, it will forward the growth thereof.

Turnips are full of a juicy ſubſtance; and though the ſand be ever ſo dry, when thrown among them, yet they naturally ſweat, when packed together; therefore they communicate a moiſture, which, together with the natural hot quality of the ſand, raiſes a ſtill greater heat; and every one knows that moiſture and warmth are two qualities which force vegetation and the vegetations of ſuch roots is the firſt thing that helps to render them uſeleſs; for being out of the ground, they grow, till all the growing quality be exhauſted; after which they putrify, and are not fit for food.

However general the practice of burying among ſand may be, yet the above are truths and reaſons, which muſt carry conviction along with them, to every reaſonable man. But thoſe who doubt it, can eaſily be convinced upon trial.

The eaſieſt and beſt method to preſerve any ſort of roots from vegetation, and ſo conſequently to keep them longeſt good for food, and particularly turnips, is, to ſtack them up in ſtraw.

The method is ſimple and eaſy; one load of any ſort of dry ſtraw is ſufficient to preſerve an acre of fifty tons weight of turnips.

You muſt place the houſes ſo, as to leave every third ridge without a houſe going on it; you muſt pull up the turnips of this ridge, cut off the tops and tap-root, and give them to the ſheep in the houſe next to the ſaid ridge, as it goes along.

Throw the turnips in a ſort of a windrow, on the middle of the ſaid ridge, ſo let them lie a few days; and, let what weather will come, they will take no damage.

When you think there are as many pulled, as will make a heap as large as a large haycock, you muſt then make them up in that form, with dry ſtraw.

Firſt, lay a layer of ſtraw next the ground, and upon it a layer of turnips about half a yard thick; then another layer of ſtraw; ſo go on alternately, laying a layer of ſtraw and a layer of turnips; every layer grows narrower, till it comes to nothing, at top, like a ſugar-loaf.

The laſt layer muſt be ſtraw, which ſerves as thatch to keep all dry.

You muſt obſerve always, when you have laid a layer of turnips, to ſtroke, or lap up the ends of the under layer of ſtraw over them, in order to keep them cloſe, or from tumbling out.

You ſhould have in readineſs, ſtraw in the field, made in little cocks, whereabouts you think the heaps of turnips will be.

In ſpring, when you want to eat the turnips, you muſt run the houſe up the ſaid ridge, and throw them into the rack; you will ſcarce ever have the turnips above thirty or fifty yards to carry; and the land is manured as well as the firſt; and the turnips by this method, are preſerved freſh, ſound, and juicy.

When they ſweat, the ſtraw, imbibing the wet or watery particles, prevents vegetation.

This method will anſwer the ſame end as to parſnips, carrots, or potatoes, &c.

For want of ſtraw, old ſtack bottoms, ruſhes, or ſtubble may anſwer the end; provided they are dry.

No one, that has turnips, but ought to follow this practice; as every one knows, that, if the weather be mild, they will begin to grow about the latter end of February; after which they grow, every day, worſe and worſe for feeding.

As the ſubſtance grows into the top, it leaves the turnip dry and woody; therefore the ſheep or cattle do not like them, and conſequently do not feed kindly thereon.

CHAP. XI.

A PICKLE to prevent the FLY from deſtroying young Turnips, Smutty Wheat, &c.

UPON looking at the head of this chapter, ſome of my readers may want faith to believe it; therefore in this, as in other caſes, it may not be amiſs to give ſome reaſons how the pickle operates, ſo as to prevent this malady; which few words may explain.

I ſuppoſe it would not be hard to make any farmer believe, that, were we to daub every leaf over with brimſtone, or ſuch like poiſonous obnoxious qualities, that would hinder the fly from preying thereon; but, ſays he, how is it poſſible that ſteeping the ſeed (tho' in ever ſo obnoxious a liquor) can hinder them from preying upon the leaf?

We muſt conſider that the damage received from the fly, is, when the turnip is in its ſeed-leaf; the ſaid leaf being ſoft and tender, the fly feeds thereupon; and the bite thereof is very poiſonous to the plant, while in its infant ſtate.

But after it gets out of the ſeed-leaf, it is ſafe; becauſe the ſecond leaf is armed or covered with a kind of down or beard, that is ſo thick-ſet and pointed, that the fly cannot come near the leaf, to feed thereupon; by which means the plant is preſerved.

Upon turning to the chapter on ſmutty wheat, you will ſee, that, for the very reaſon why the pickle prevents the worms from preying upon the root, and cauſing ſmut in wheat, for the ſame reaſon it operates upon the leaf in turnips, and prevents the fly from preying thereon.

The nature of a grain of wheat and that of a turnip are quite oppoſite; for the bran or huſk of wheat ſtays in the root in the ground, whereas that of turnip-ſeed riſes upon the leaf.

In ſhort, the leaf of all oily plants is lapped up in the ſeed in miniature, and when raiſed into vegetation, the ſeed, as it were, unfolds or opens itſelf all into leaf; this is what is generally called the ſeed-leaf.

takes the form of a leaf upon it; tho' it is not laſting; for, as ſoon as the root begins to feed upon the ground, it throws out another of a harder kind, which, as before obſerved, is covered with a ſort of a down or hair; and then the ſeed-leaf falls off, or inſenſibly dies away.

Therefore, it is no wonder, that the ſeed-leaf ſhould retain an offenſive ſmell or taſte, which ſtrongly affects theſe diminutive inſects, whoſe ſenſe of ſmell and taſte are in proportion to their ſize; and the ſeed being ſteeped in a poiſonous, nauſeous liquor, the leaf, wherein lies their food, retains the ſaid nauſeous quality; which they are ſenſible of, and therefore forbear feeding thereupon.

I do not ſay that the pickle will kill them; tho' it is not impoſſible; ſhould hunger inforce them to feed upon it, which is ſcarce probable; but if it prevents them from doing damage, it anſwers the end deſigned; and this I can, from experience, vouch that it will.

However, to be more ſecure, I would adviſe always to ſteep one half of the ſeed, and to ſow the other half unſteeped.

Should the flies be very predominant and hungry, they will feed upon that which was not ſteeped, till the other has got into the ſecond leaf; and if one half grow, it will do more than ſeed the ground; for there are more grains in half an ounce of ſeed than ſquare feet in an acre, were they properly placed.

Therefore I ſay, if a farmer ſows his uſual quantity of ſeed, which is a pound upon an acre, one half ſteeped in the poiſonous pickle, and the other half unſteeped, for the flies to feed upon, he need not fear a crop, be the flies ever ſo numerous, for the half pound that is pickled, will be more than ſufficient ſeed for his land.

Some people will ſow half new ſeed and half old, which is a ſenſible way; for the new ſeed comes up three or four days earlier than the old; therefore, ſay they, the flies are feeding upon the new ſeed, until the old gets into the hairy leaf.

Tho' there may be ſome reaſon in this, yet I know from experience, that the ſucceſs is not ſo certain as to pickle half.

For, being importuned by a gentleman in the Society of Arts and Sciences, to ſow half new and half old ſeed, (as he aſſured me it would anſwer the end) I ſowed a field with ſeed, variouſly prepared, ſome by this method, ſome by pickling all the ſeed and ſome half pickled and half unpickled.

The trial was very fairly decided in favour of the laſt method; for it happened to be a dry time, when flies were very predominant, and therefore gave a fair opportunity to reduce it even to a certainty.

The RECEIPT.

TO every gallon of old chamber-lees, add three ounces of copperas, two quarts of train-oil, half a pint of the oil of turpentine,

pentine, three ounces of the balſam of ſulphur, three ounces of nitre, one quart of bullocks gall, which may be got of the butchers, bruiſe and ſpueeze therein a dozen of heads of garlick, add as much ſoot as you ſee will make it of a thick ropy ſubſtance, in order that as much of the liquor as poſſible may be left ſticking about the grain, that it may gather a thick coat when mixed with the compound powder, which will both add to the manure, and be a preventative againſt vermin.

When all the above ingredients are mixed, add to the liquor two quarts of bay ſalt.

The longer all theſe are mixed before you want them, the better; becauſe they will then have ſufficient time to incorporate together, by which means the mild, ſmooth ingredients will ſoften or miliorate thoſe of a more harſh, churliſh nature; and therefore there will be leſs danger of their deſtroying the growing quality of the ſeed.

In this liquor ſteep your ſeed ſix or eight hours, then take it out, and preſerve the pickle for further uſe; mix the ſeed with the following compound of powder, viz.

The Compound MANURE.

TO every peck of aſhes, take half a peck of ſoor, half a peck of lime, one pound of roſin, and one pound of brimſtone in powder, mix all well together, and ſift it through a fine ſieve, in order to take out all the lumps; ſpread ſome of this powder on a table, thin, with a ſieve, (which will let through the ſort of ſeed you want to mix) ſift ſome of the ſeed over it, and mix or rub it with your hands, in order to candy it over with as thick a coat as you poſſibly can.

It is beſt only to mix a little at a time, and when it grows too dry, ſprinkle a little liquor over it again, until you enlarge the grains to the ſize you would wiſh, the larger the better.

The ſame pickle, powder, and management, will do for any ſort of corn, ſeed, or grain, that you would ſow in the manner as deſcribed, with my new-invented tranſplanting machine.

In ſhort, was I to ſow ever ſo much in the old broad-caſt method, I would prepare it in the above manner; but as many farmers which ſow great quantities, may not chuſe to take the ſame trouble with all their ſeed, ſuch may ſteep their grain in the general pickle for ſmutty wheat.

There is one thing, as directed in the next chapter, which I beg to take notice of, before I leave this ſubject, and that is, to aſſure my readers, that neither this pickle, nor the general pickle for ſmutty wheat, will deſtroy the growing quality of any ſeed, when ſteeped therein for any reaſonable time.

That is not the caſe with regard to ſome pickles, which have been preſcribed in other books of huſbandry; I have, myſelf, loſt a crop of wheat, by ſteeping the ſeed twelve hours in a ſtrong ſalt pickle, wherein was mixed one pound of copperas to every fifteen gallons of liquor. I have alſo known ſeveral other farmers to meet with the ſame fate, by uſing the ſame ſort of pickle.

Indeed, there is no general rule without an exception; for I have known wheat to have its growing quality deſtroyed in ten or twelve hours, when other wheat has lain forty-eight hours in the ſame pickle, without being hurt.

At firſt ſight, this may ſeem very amazing; but however, it is eaſily accounted for, as it is all owing to the ſtate or dryneſs of the ſeed, when put into pickle.

If old, dry wheat be put into pickle, it will retain its growing quality a long time; becauſe the body is ſo cloſe, hard, and obdurate, that it reſiſts the keen, ſharp, and ſearching particles of the liquor, for a time, and only lets it penetrate by degrees.

Whereas, on the other hand, if the grain be ſoft and full of water, its pores are all open and tender; therefore the ſharp particles of the liquor ruſh in, and ſeize it all at once, when in this open unguarded ſtate, and may do more hurt to the growing quality in one hour, than they would, in the former caſe, do in twenty.

The reaſon that my pickle does not ſo quickly affect, or deſtroy the growing quality of ſeeds, is, becauſe the ſharp, acid and poiſonous particles of ſome of the ingredients are checked, mollified, or let down, by the ſmooth particles of the oil; which yet, at the ſame time, does not deſtroy the force of thoſe ingredients.

Moſt people own, that oil is an antidote againſt poiſon; and alſo that, if ſpirits of turpentine, or ſuch like hot oils, be applied to a horſe, for a ſprain, or the like, they will fetch off the hair; but mixing them with any ſort of oil or greaſe, will prevent them from having that effect.

In ſhort, numerous hints might be given, to ſhew, how neceſſary it is to add oil to pickle, in order to ſmooth and qualify, and bring it to a proper conſiſtence, that it may not be injurious to the growing quality; was the oil of no other real uſe; but it certainly is.

The chief object of the aforeſaid ingredients being mixed all together, and called a pickle, is, to prevent flies, worms, or any thing that is of the nature of theſe ſpecies, from preying upon or damaging our crops.

Moſt grubs or worms are the parents of flies; therefore what is poiſonous or obnoxious to the one, muſt alſo be offenſive to the other.

Now, all the ingredients which compoſe the aforeſaid pickle, are, jointly and ſeparately, antidotes againſt either fly, or grub, or both; as for inſtance, rub a horſe over with train-oil; and, ſo long as the ſmell remains, a fly will not bite him; ſulphur, ſoot and chamber-lees, are alſo their averſion; and ſo are lime, ſalt, turpentine, copperas, roſin, galls, and garlick, antidotes againſt the worm and grub-tribe.

The above liquor is not expenſive; and will abundantly enrich the crop; particularly if the ſeed be well coated over with the compound powder; therefore I would adviſe it to be applied to the three following grains, viz. wheat, barley, and turnip-ſeed.

CHAP. XII.

General PICKLES for Wheat.

THE following is a general pickle for wheat, to be uſed by ſuch farmers as ſow great quantities, and will not go to the expence of the above pickle and powder, viz.

Take a tar-hogſhead; let it into the ground, with its top even with the ſurface, in ſome bye place, having a cover thereon.

In this keep chamber-lees, from one ſeed time to another; the older it is, the better; in this throw all the bullock, ſheep, hogs, or any ſort of galls you can get; the more the better.

In each hogſhead full of liquor put two gallons of train oil, a great many heads of garlick bruiſed, one pound of copperas, one pound of nitre, and one ſtone of bay-ſalt; ſteep the ſeed therein eight hours, and ſkim off all the light ſeed that ſwims at top; then take it out, and, on a floor, mix it with quick-lime and ſoot, of each an equal quantity, till it be of a conſiſtence proper for ſowing.

It has always been a maxim for farmers, to ſow new wheat; thinking that old would not grow; but they may reſt aſſured, that it is rather better than new, and particularly if ſteeped in this pickle.

And would they come generally into this method, of ſowing old wheat, it would ſave them a great deal of hurry and trouble in threſhing out ſeed-wheat in the buſy wheat-ſeed time.

But thoſe that ſow new wheat, I would adviſe them to have it as dry as poſſible, before they put it into the pickle. If the ſeed be well candied, no fowls, ſuch as crows, pigeons, &c. will touch it, neither will field-mice eat it.

I might add ſeveral other pickles, but ſince I know the above to anſwer every good end of enriching the ſeed, preventing all ſorts of vermin, and worms, grubs, flies, &c. from damaging the crop; and as the ingredients are cheap, and may be got in any country town, I think it would be in vain, to perplex the farmer's ideas with any other.

I ſteeped ſeveral ſorts of grain twenty-four hours; notwithſtanding, I believe, every grain that was ſown grew.

CHAP. XIII.

How to clean BLACK or SMUTTY-WHEAT, without waſhing.

THOUGH the foregoing pickles may prevent ſmutty-wheat, yet if, by neglect, ignorance, or any other unforeſeen accident, it happen that the farmer do not apply it, and that his wheat be black or ſmutty; the eaſieſt and beſt remedy to cure the malady, by taking off the ſmut, is, to threſh it in ſand.

The wheat being threſhed and winnowed in the uſual manner, if any ſmut be thereamong, it will appear at the downy ends of the grain; for, when the balls are broke, the incloſed powder being of ſo exceſſive a light, fine nature, it ſticks among the down, or in any other crack or crevice that may happen to be in a grain of wheat; and, when it comes to be ground, it mixes with the flour, and makes the bread black and diſagreeable.

The uſual method is, to waſh it in clean water; but it is not only vaſtly troubleſome to get it dry again, but it ſpoils the beauty and brightneſs of the grain; neither will it ever make ſo fair puddings or bread, as others which are clear from this malady.

The corn being winnowed, be provided with a cart-load of dry, ſharp ſand; ſuch as is generally uſed to mix with lime for mortar; ſiſt it through a fine ſieve, upon the threſhing floor, about three inches thick; then ſpread the wheat over it, about two inches thick; being thus prepared, threſh it, as you would barley, when you want to take off the awns or beards.

This done, turn it up to one corner, with a ſhovel, and ſpread, as before, the floor again with more clean ſand.

Then ſiſt out the ſand from the corn that is already threſhed, and throw it over the clean ſand, and give it another threſhing; which two threſhings will effectually clean it from ſmut.

The cleaning ſand will ſerve for the firſt threſhing of another floor-full; but it cannot be effectually cleaned without once ſhifting, and threſhing in a ſecond ſand.

One man may, by this method, clean three or four quarters on a day; the ſand ſcours, cleans, and brightens the corn; and if, upon laying it on the floor, you ſift it through a fine ſieve, the ſame ſand will run through the ſame ſieve, when ſeparated from the wheat; and the wheat will ſtay in the ſieve.

CHAP. XIV.

A compound Manure to improve LAND, and alſo to prevent the RED or CUT-WORM, and the SLUG from deſtroying Green Corn, &c.

IF my pickles for wheat or turnip ſeed be duly attended to, and the grain candied with a thick coat of manure, it will be a great means to prevent any inſect of the worm, grub, or ſlug tribe, from preying upon the crop, for it is ſo extremely offenſive to them, that they do not care to ſtay in the root where it is; except the land be very full of them, and other food, ſuch as weeds, graſs, &c. be ſcarce; in ſuch caſes, hunger may force them to eat what they did not like; therefore I ſhall propoſe other remedies, that will more immediately fall upon their food, and prevent them from eating thereon; but ſhall firſt give a deſcription of the grub that does the moſt damage to corn in its green ſtate.

The cut-worm, or by ſome called the red worm, is of the grub or maggot-kind; it is about three quarters of an inch long, and is about the eighth of an inch in diameter; the body is of a pale yellow colour; but its head is almoſt black, or of a deep red; it has a ſort of feet, but, by nature, is extremely helpleſs as to motion or movement; one can ſcarce ever ſee it creep; if a plow or ſpade throw it above ground, it is long before it can get itſelf again covered with mold.

Therefore if land be often turned up with plow, harrow, or other inſtruments, theſe worms are quickly deſtroyed by the fowls of the air, when expoſed thereto.

Their food lies in the roots of graſs, corn, or other vegetables, which are ſoft and juicy, the greateſt damage they do to green corn is, from about the beginning of April to the latter end of May.

They cut the corn off, as if cut by a knife, about an inch within the ſurface of the earth, ſo that the crop dies away, and the crop is entirely loſt.

I have ſeen a cloſe, containing twenty acres of wheat, which was a fine crop, the latter end of April, but by the latter end of May was all deſtroyed, ſo that the land was obliged to be plowed up in June.

In ſhort, they are a very deſtructive creature; I have tried many experiments to prevent the crop from being deſtroyed by them; but found none ſo effectual as the compound manure as ſollows, viz.

To every ten buſhels of ſoot mix ten buſhels of any ſort of dry aſhes, ten buſhels of unſlecked lime, ten ſtone of bay-ſalt, ten pounds of ſulphur.

Take out of the hogſhead five gallons of the pickle for wheat, and add to it five quarts of galls, which you will get at the butchers for eight-pence a quart, and five gallons of train oil; mix theſe together; having all the above articles ready provided in ſome out-building, (for they muſt be kept dry) have three or four perſons to mix them.

Firſt, ſpread on the floor a layer of aſhes, then a layer of lime, then a layer of ſoot, then a layer of ſalt; a perſon, all this time, muſt be ſprinkling on the liquor, and another perſon dridging on the ſulphur, in order to mix every thing as even as poſſible together.

Being thus mixed, be provided either with a cart-load of dry aſhes, or, for want of theſe, a cart-load of fine dry mold out of a fallow-field, with which the compound muſt be cloſe covered, in order to keep in the ſteam or vapour, which will naturally ariſe from the heat of the lime when flecking, and the reſt of the compound fermenting together.

When thus mixed and covered up cloſe, let it lie three or four days, or longer, if you do not want it; in this time, the lime will be flecked and fallen to powder, and the heat thereof will dry up the liquor; ſo that when the compound is turned, and well mixed, it will be a dry powder. In turning and mixing the compound, you muſt mix along with it the aſhes or dry mold that covered up the heap; when thus mixed, let it lie a few days longer, in order to incorporate together, as the longer it is made before it is wanted, the better; for it improves by age.

Chuſe a calm dewy morning, or evening, to ſow it in; the duſt falls upon the blades of the corn, and being wet, it ſticks thereto, and the next rain or dew that comes waſhes it down the ſtalks to the root; the nauſeous poiſonous quality of which prevents the grubs or worms from feeding thereon; and alſo being a rich manure, it encourages the growth of the corn amazingly.

A TABLE

Shewing the Expence of the Compound MANURE, for five Acres of Ground.

	l.	s.	d.
To ten buſhels of ſoot, about	0	7	6
To ten buſhels of aſhes, perhaps	0	0	6
To ten buſhels of lime, about -	0	2	6
To ten ſtone of bay-ſalt - -	0	10	0
To ten pounds of ſulphur, if it be to prevent the red-worm, or the ſlug; but, if as manure only, it may be omitted -	0	6	8
	1	7	2

Brought over - - -	1	7	2
To ten quarts of gall, which may be bought at the butchers; but, except the manure be to prevent vermin from deſtroying the crop, this alſo may be omitted - -	0	6	8
To five gallons of train-oil, which muſt be mixed among the five gallons of liquor taken from the pickle-hogſhead - - -	0	15	0
	2	8	10

If ſoot cannot be got, add double the quantity of lime, which will nearly anſwer the ſame end.

This quantity is ſufficient for five acres of land; and may be applied as a top-dreſſing for any ſort of land or crop, and will improve it paſt conception.

CHAP.

CHAP. XV.

A Lecture upon CATTLE and SHEEP, ſhewing how they lay on Fat and Lean, and alſo how SHEEP take the Rot, to prevent it, &c. &c.

THE rot of ſheep is very common, and, in ſome wet ſeaſons and ſpots of ground, almoſt general; and though perhaps the malady is of as long ſtanding as the ſheep themſelves, yet not one of thoſe many authors who have wrote upon this uſeful creature, has handled this ſubject properly; that is, ſo as to point out, by philoſophy, the riſe and progreſs of the diſorder; and conſequently all muſt fall ſhort of preſcribing a remedy for it.

The long experience the world has had, of the returning wet ſeaſons bringing on this malady, leaves it beyond a doubt, that the riſe thereof proceeds from abundance of water; but how this water operates ſo, as to bring on this malady, is the queſtion.

Many arguments, both verbal and written, I have heard upon the ſubject; one aſſerting, that it proceeds from the ſheeps taking in, with their food, worm ſprouts, and dirt, which is generally thrown up in great quantities in wet weather.

Others, that it proceeds from the ſheeps taking in, with their food, cobwebs, which are always very predominant in wet and warm weather, inſomuch, that the graſs is moſtly covered with them.

Others aſſert, in general terms, that rot proceeds from water; but without refining upon the ſubject ſufficiently enough to open our ideas, and prove where a remedy can take place.

The following ſhort lecture will ſhew the improbability of the two firſt problems being the cauſe of rot; and alſo prove that water is the cauſe thereof, and where it takes place; which being fully known, the thing itſelf points out a cure.

I know no animal of the brute creation, (ſuch as we have in England, or indeed any where elſe) that will live ſo long upon dry food, without water, as ſheep, rabbits, and hares; neither are there any creatures that are ſo ſubject to rot, as theſe.

A ſheep may be reared upon the higheſt and dryeſt lands, in the hotteſt ſummers, and never deſire water; and yet they will drink, if they come where it is; they will alſo bear a great deal of water, if it be proportionally mixed with ſalts, as appears by their living and feeding upon turnips, which are a very watery root; but then this is mixed with a proportionable quantity of ſalts.

There is likewiſe no ſort of graſs that grows up more quick, or is fuller of water, or juices, than that which grows on ſalt marſhes, I mean on ſuch land, as has been either gained from the ſea, or where the ſea ſometimes overflows; yet ſheep will never rot upon it.

So far from that, ſheep have been often known to knit or recover (which has been tainted aforetime) when put thereon; the reaſon is, that, though ſuch graſs be full of water, yet it is alſo full of ſalts, which by checking the redundancy of the water, prevent its doing of the miſchief by rot it otherwiſe would, and which is generally done by waters that are diveſted of ſuch ſalt particles.

Having given theſe hints, I ſhall now proceed to ſhew where and how the rot takes place.

The word rot, ſignifies a putrefaction, or a decay of the liver.

The animal body is enlarged in the various ſorts of fat, lean, blood, bone, &c. by a vapour or ſteam, that ariſes from the maw, and which diſperſes itſelf as ſuch, through the whole animal body.

The mouth is to take in food, and the maw is a repoſitory where it remains, till the heat thereof brings on a fermentation; after which comes a corruption, and then a digeſtion, which is a ſeparation of particles into the ſmaller bowels, where there is a ſtill greater degree of heat, which cauſes a rarefaction; that is, it rarifies, and ſeparates the moſt oily rich particles of the food, from thoſe of a more barren nature.

Theſe latter are voided as excrements; but the former penetrate or evaporate thro' the ſkin of the bowels, in a ſteam or vapour, and are diſperſed to different parts of the body, ſome as bone, ſome as fat, ſome as lean; and others as water or urine into the bladder.

In all evaporating matters, that of the moſt corroding nature flies off firſt; and this is what lays on, or feeds the bone;

the next degree lays on the lean and the ſinews; and that of a more mild, ſmooth nature, lays on fat.

Theſe, being the richeſt particles that are impregnated with food, are the firſt that riſe into a ſteam, are rarified and thinned into very fine particles, and then penetrate through the whole ſkin of the bowels, and are diſperſed through the whole frame of the body, and adhere to each part, according to its nature, as aforeſaid.

The next ſubſtance, that paſſes or evaporates through the incloſure of the bowels, is water or urine; and as all food is mixed with a greater quantity of this than the aforeſaid refined matter, the diſcharge is quicker and larger in proportion.

If the food be mixed with a redundancy of water, and be deſtitute of a proper quantity of ſalts to digeſt the water, the animal muſt ſuffer thereby.

I ſay,

I ſay, digeſt, becauſe it is the ſalts that open the pores of the ſkin, or incloſure of the bowels, and alſo that of the bladder, and make paſſages for the water to paſs therein.

For there is no viſible orifice for ſuch a diſcharge out of the bowels into any part of the body, from the mouth to the fundament; neither is there any paſſage, by any viſible orifice into the bladder, but through the neck of it; and this is purpoſely for the diſcharge or emptying of the bladder, and not for taking in water; for the water enters the bladder through the ſkin, by an evaporating ſteam; and it is the ſalt particles that divide and open the ſkin of the bladder, and make it porous; which gives admittance to the water.

But ſhould the water be of a poor thin quality, and deſtitute of a ſufficient quantity of ſalts to keep it alive and active till it enters the bladder; in ſuch caſe, it falls upon the liver, in large drops, and, not having ſalts thereamong to check it from doing harm, and being in a hot ſituation, it ſcalds (as it were) and wounds the liver, under each drop of water, which ſoon turns to decay.

The point of the liver is generally firſt affected; and the reaſon is, becauſe it lies neareſt the maw, from whence this evaporating water proceeds; it is alſo of the coldeſt, deadeſt nature; being fartheſt from the heat of the blood, which flows more rapidly in thoſe blood-veſſels, that are more large and plentifully placed, in the thick part of the liver, and which are near the heart; and therefore that thick part of the liver has a greater chance to reſiſt, or work off the wounding water; which it does, until it comes in too great abundance for nature to withſtand; in ſuch caſe the ſheep cannot long ſurvive it.

The graſs that is impregnated with this poor unſpirituous water that rots the ſheep, is ſuch as grows in low ſwampy places, and which perhaps is forced up in one night's time; in wet and warm weather, it ſprings up ſo rapidly (muſh-room-like) that it has not time to collect the ſalts of the earth, to bear a part in its compoſition, but conſiſts chiefly of the rain-water that perhaps fell the night before, and which (as I have obſerved in ſome other parts of this work) had juſt undergone a rarifaction, or dividing of the ſalts from the water, in the firmament.

This frothy graſs may be known by a large drop of water ſtanding at the top of it; the ſheep eat the ſaid graſs greedily up, and with it ſwallow a great deal of the ſaid water, which, being incloſed in the maw, heats, and evaporates into a ſteam, and not having a ſufficiency of ſalts intermixed therewith to perform the office of digeſtion, by opening the different paſſages, as before hinted, likewiſe to keep the vapour or ſteam alive and active till it enters the bladder; but I ſay, for want of ſuch a proportionable quantity of ſalts, it falls upon the liver, and rots it as aforeſaid.

When my reader ſees and conſiders the premiſes attentively, it cannot but appear very plain to him, that what I have ſaid is matter of fact.

That the rain-water, which has juſt undergone a rarifaction, or a dividing of the ſalts therefrom in the firmament, deſcends and is taken up into the body of the ſheep, by means of the aforeſaid frothy graſs; and then it falls upon the liver, and wounds it.

Admitting that this is the caſe, as it certainly is, a cure, or at leaſt a preventative, ſpeaks for itſelf, namely, ſalt. This is what will certainly prevent the rot, if timely applied, without any aſſiſtance from other ingredients.

My method is, when I ſuſpect a rotting ſeaſon, to give my ſheep, each, a ſpoonful of dry ſalt. This quantity is ſufficient to temper and mollify all the food that is taken in for one week; it mixes among the food, in the maw, and evaporates among the watery particles thro' the body, and prevents their wounding the liver, by giving them a quick paſſage into the bladder.

By this ſimple and cheap application, you take away the cauſe of rot; and the ſucceſs is not doubtful, but certain; and by frequently uſing your ſheep to it, they will in time, learn to lick the ſalt, of themſelves, if you lay a little upon a flat ſtone, in ſeveral parts of their paſture; they are by nature fond of it; therefore if you once get your flock accuſtomed to it, the trouble is over, and you need not fear having a rotten ſheep on any land, or in any ſort of weather.

When the ſheep has got the rot in the thick part of the liver, there is no cure; but if it be not over-far gone, there can be no better remedy than the receipt preſcribed in another part of this work.

The wormwood, rue, and balſam of ſulphur, together with ſalt, act in a more forcible degree, in purging the liver, when it is once ſeized or wounded by the water.

I have tried the ſpirits of turpentine, giving a ſpoonful to each ſheep, as has been adviſed by ſome authors, but I did not find it to have ſo good an effect as the above medicine; but, as it is of a very penetrating healing nature, I believe it might be of ſervice, was one ounce added to every quart of that tea. This I have not tried, but am determined to try it the next time I have occaſion.

Let no man deſpair of ſucceſs from the above applications, as they have been proved, both by reaſon and experience, to be effectual.

Miſtake me not, I do not mean that they will cure all; though I am clear the ſalt will prevent all from rot, if applied; for if the thick part of the liver, that is ſeated among the blood-veſſels and near the heart, be once tainted, you may as well offer to bring the dead to life, as cure ſuch; tho' at the ſame time, thoſe which are not above half-rotten may be prevented from going farther; and the liver, as far as is rotten, will knit; ſo that the ſheep will ſtand feeding the enſuing year.

I do not mean that the farmer can ſee into his ſheep which are curable and which are not; but applying the medicine to all, if he ſave ſome, he is well paid, ſince it is cheap and ſimple. I know that many poſſitive, bigotted people, who can judge no farther by reaſon than they can ſee with their eyes, will d—n me for a fool, for pretending to cure the rot in ſheep, a thing they think impoſſible, on ſuch my labour is loſt, and they have no advantage, becauſe their faith will not let them try the medicines.

Others may apply the medicine; and ſome of their flock may be too far gone for cure, therefore die; the farmer ſees this with his eyes, he knows he applied the medicine to theſe ſheep; he ſees them dead, and upon opening them, he finds them rotten.

Here again I ſuffer in his opinion; he d—ns me and my medicine, becauſe it did not perform miracles; the ſheep that live he immediately concludes were not rotten, ſo no thanks to his medicine for their cure, ſays he.

However, I ſhall be more ſatisfied with his curſes, than with thoſe from him who will not try it at all, becauſe I may happen to have ſaved all the ſheep that live in his flock, unknown to himſelf; therefore, I ſay, I am ſatisfied, ſince he is the gainer, and I am no worſe for his taunts, &c.

I ſpeak this knowingly; as I have many a time heard diſcourſe to the ſame effect, among a table-full of them, on a market day.

I once was preſent at a table, in Lincolnſhire, where ſat about twenty-five farmers, moſt of whom lived near the ſea ſide, where their ſheep went upon ſalt-marſhes.

There were ſome others that came out of the rotten ſheep country, and were then at a fair, buying ſheep, to replace their ſtock, that were gone off by the rot.

So that the diſcourſe naturally turned upon the ſubject of rotten ſheep, with their cures, land, &c.

Here I heard various opinions on the ſubject.

It happened that there was one man in company, who had ſaved his ſheep from the rot, by my directions, in giving them ſalt, which he advanced as a truth; but it was looked upon as a chimerical ſtory, by thoſe who came out of the rotten

ten ſheep country. This led me deeply into the ſubject to ſupport the cauſe, which that I might do more forcibly, I was obliged to preach a ſort of a lecture, to the profit of the foregoing diſcourſe, by which I believe I made converts of all that heard me, and particularly when they came to compare corroborating circumſtances, in regard to ſalt-marſhes never rotting ſheep, and the like.

However, when I came to this part of my diſcourſe, a contradiction aroſe, that had well nigh blaſted all my hopes, it came forth ſo well atteſted by one of the company; and this was, that ſheep did rot upon a ſalt-marſh, for that he himſelf loſt above half his flock, one year, by it; and that when the remainder were killed, the year after, their livers had been touched, but were knit again; this was not only atteſted by himſelf but by two or three of his neighbours.

This tale ſeemed to gain ground for ſometime, and I believe, he himſelf thought it; but after many croſs examinations and queſtions, he remembered that he had (ſome time of the year they were rotten in) turned them into a fallow cloſe he had in another farm, for about a fortnight, to eat the graſs before it was plowed; but he concluded, that it was impoſſible for them to catch the rot there; they were in ſo ſmall a time, therefore thought nothing of it.

However, in the end, inſtead of this tale making againſt my argument, it made for it, as it was evident they got the rot there, and might all have died, had they not been taken out in time, and put on to the ſalt marſh, which knitted, or cured thoſe that lived, being not ſo far gone as the reſt.

In ſhort, it was agreed by all the ſalt-marſh-farmers preſent, that ſheep will not rot on a ſalt-marſh; that it is rather a remedy for the diſorder, if not too far gone.

Salt is a very wholeſome thing for all ſorts of cattle, it not only keeps them cool and open in their bodies, by giving a quick and regular digeſtion to their food, but it is an antidote againſt grubs and worms, and alſo a preſervative againſt every diſorder or infection.

It would be well done of every farmer or ſtock-maſter, to give their cattle a handful of dry ſalt every now and then, or to learn them to lick it off ſtones; which they ſoon will do, with a little trouble, if placed up and down their paſtures.

CHAP. XVI.

On CABBAGE, as Food for Cattle, &c.

THE next artificial winter food, for cattle, to turnips, is cabbage; and in clay or ſtrong lands, if well managed, perhaps it may be ſuperior to turnips; but a man may as well throw his crop away, as be a ſloven or a niggard in his management in any crop, particularly cabbage, as this crop above all others, will not bear bad management; the ground muſt not only be well tilled, before it is tranſplanted, but it will be well hoed, and kept clean of weeds after.

It would be more profitable to a farmer, to ſow only half the quantity of land, and manage it well, ſo as to have it all produce a full crop, than to ſow twice the quantity, on the other ſide of the queſtion; he would be a much greater gainer, even though he had the land rent-free; as the rent of the land is a trifle, in regard to a good crop of cabbage.

I have known many experiments made on this vegetable; and the worſt conducted one I ever ſaw, proves it to be a piece of huſbandry that by no means ought to be neglected; and that every farmer ought to have more or leſs of it, every year, under cultivation.

I ſhall give ſeveral experiments, that prove it to leave a very large profit; but ſuppoſe it did not leave half the profit of the worſt crop I ever ſaw tried in feeding bullocks thereon, (which is the faireſt way to prove its value) yet a farmer ought not to be without it, becauſe it is an excellent food to create milk; neither does it leave ſo rank a taſte in milk or butter, as turnips; it is alſo excellent food for year-old calves.

By comparing my own experiments with every other experiment I have ſeen made upon this excellent vegetable, and drawing a medium therefrom, I find that the huſbandry which is the beſt, and moſt certain of a crop, and that of the moſt value, is as follows:

It appears, from every experiment, that though any land will bring cabbages, if well tilled, yet the crop always augments in value, the richer the land is, and the nearer it approaches to a loamy clay;

and if the ſtaple of the land be ſhallow by nature, it muſt be deepened by art, to bring it to a proper conſiſtence; for this crop is particularly fond of a deep ſoil.

Any ſort of ſtubble-land may be winter-fallowed for this crop; and the ſooner it is plowed after the crop is off, the better; for two reaſons.

Firſt, the earlier the ſtubble is turned under, while it retains any of its ſap, the ſooner it rots, and is converted into manure.

Secondly, the land, being early turned, reaps ſome advantage, as a fallow, from the preſent ſummer; and the longer it is expoſed to the atmoſphere, the richer the ſalts thereof will make it.

For the above reaſons, plow your ſtubble-land before Michaelmas; and by the middle of November the ſtubble will be pretty rotten; then harrow it, and lay it up in two furrow ridges, that it may lie dry all the winter, and by having ſo many out-ſides, and lying as it were in a heap, it mellows, and enriches paſt conception.

This work is quickly performed, as only half the land is plowed, for the plow lays two furrows back to back, therefore about one half of the land is covered up with the other half.

Being thus in narrow ridges, it will be dry and ready for working, any time in March.

Level the land, by harrowing acroſs; then plow it clean, and again in the beginning of May, and alſo juſt before you tranſplant the cabbage; the beſt ſeaſon for which, is, from about the middle to the 24th of June; however it is beſt to tranſplant at twice; that the crop may one part ſucceed another; in this caſe, the firſt planting muſt be at the latter end of May, and the laſt about Midſummer; the former may be begun to be eat about Martinmas; and the latter will hold good till April; particularly if you ſow the long ſided Scotch ſeed, which is abſolutely the beſt for cattle; as they are the hardeſt and of the greateſt produce.

The firſt favourable ſeaſon, after the firſt of February, ſow your ſeed on a ſeed-bed, either in the garden, or in ſome rich warm corner in a field, having a hedge to the eaſtward, to prevent the froſty winds from damaging the plants; half a pound of ſeed, ſown, will raiſe plants for ten acres of ground.

It is found from experience, that the beſt method is to tranſplant immediately from the ſeed bed into the field, without the expence or trouble of pricking out; the plants ſooner take root, and fewer of them fail.

In taking them up, it is beſt to lighten the ground with a dung fork; becauſe if they come hard by pulling, it hurts the fibres or veins between the leaves and the root; and ſometimes a plant will die, by overſtretching in this part, which, if taken gently up, it would not.

The approved diſtance, by experience, to place the plants from each other, is four feet between each row, and two feet between each plant in a row.

An acre, at this rate, will take 5445 cabbage-plants. Two men and two boys will plant, at this diſtance, an acre on a day.

It would be ſwelling my work to a mere chit-chat, were I to point out every ſort of manure that is proper for cabbage; for, in ſhort, they will improve and feed upon any ſort; and every farmer knows beſt what he can ſpare for this purpoſe; rotten ſtable-dung, or aſhes, they are particularly fond of.

The beſt method to lay on the manure, in order to make it go far, and that the plants may reap immediate benefit from it, is, to plow furrows four ſeet from each other, through the whole piece intended; then ſpread the manure in each furrow; after which go with the plow, and turn the ſame furrow back again upon the manure.

In this row ſet the plants; it will be a guide for the dibblers to go by; and the roots will fall among the manure; and if damp, will make them more immediately take root; and half the dung will be of more immediate uſe, than if ſpread promiſcuouſly over the ground.

In order to find proper diſtances more readily, take a gardening line, and at every two feet, put a bit of rag between the ſtrand; the man muſt run the ſetting ſtick cloſe down by each rag; and the boy which puts in the plants, muſt draw the mold about the roots, and ſet his feet at each ſide, cloſe to the plant, to cloſe it firm.

I find that a man to make holes, and a perſon of low wages to put in the plants, will make more ſpeed, than when each perſon makes holes, and ſets them, himſelf.

There is no need of being at the expence of watering them; as they will bear a dry time, better than any thing I know of.

As ſoon as you ſee the weeds begin to grow, it is the time to horſe and hand-hoe; the firſt hoeing, perhaps, will be about the middle of July.

Many farmers, who do not underſtand the method of horſe-hoeing, may think it a nice piece of work; and that it requires hoe-plows at great expence, &c. But there is no need of all this; the work may be performed very well, and ſimply, with a common plow; the beſt method is this, viz.

Go with the plow, and turn a ſurrow from each ſide of each row; cut as near the ſtalks as you can, ſo as not to damage the roots, by turning a furrow from each ſide. The furrows then meet back to back in the middle of the four feet intervals; then have a ſingle harrow, made in the ſhape of a heart, the thick or wide end from corner to corner three feet; it muſt be drawn by the ſmall end, twice backwards and forwards, in each interval; this will pulveriſe the mold, and ſhake out the weeds; when harrowed, let it lie two or three days, in order to expoſe the weeds to the ſun, to kill them; then go with the plow, and turn the ſame furrows to the ſtalks, that you before turned from them; but plow deeper, in order to raiſe the mold higher againſt the ſtalks; when you have turned theſe two furrows back to the ſtalks, you will find, at leaſt, two more in the middle of the interval; therefore, you muſt continue, till you have finiſhed plowing it all the ſame way.

One horſe-hoeing, by this method, is as good as two, by only plowing a furrow againſt each row, as many do.

Two ſuch horſe-hoeings will keep your crop ſufficiently clean, all ſummer; you muſt alſo hand-hoe between each plant, in the lengthway of the row.

A good acre will produce from fifty to ſixty ton of Scotch cabbage.

A large ox, from eighty to a hundred ſtone weight, will eat about fifteen ſtone of cabbage, and half a ſtone of hay, in every twenty-four hours. This will fatten him, in between four and five months; but, to avoid fractions, we will only ſuppoſe an acre of fifty tons produce, to fatten four oxen, and each ox to leave five pounds profit between buying him in lean and ſelling him out fat. This leaves twenty pounds an acre, to pay the expence, and for profit, as the following table.

A TABLE

A TABLE

Shewing the Expence and Profit from an Acre of CABBAGE eat by Cattle.

To two chaldron of lime - -	0	18	0
To land-rent - - -	0	15	0
Four plowings and two harrowings	0	12	0
To planting - - -	0	2	8
Two horſe-hoeings, and hand hoeings - - - - -	0	10	0
Hay for the four oxen, at times, when they are on the cabbage -	2	5	0
To intereſt for the money; ſuppoſe the four oxen coſt fifty pounds, half a year's intereſt is, at 5 per cent - - - -	1	5	0
Total expence - -	6	7	8
Which deduct from twenty pounds, leaves neat profit - -	13	12	4

This is a very conſiderable profit; one would think, enough to encourage any farmer to cultivate this valuable crop; and yet, as high as it may appear, it is far ſhort of what has been made by ſeveral ſpirited worthy gentlemen in Yorkſhire, who for ſeveral years paſt, have been trying experiments in this crop, and with the greateſt ſucceſs too: to their honour be it ſpoken.

Charles Turner, Eſq; Chriſtopher Crow, Eſq; Simon Scroope, Eſq; E. M. Ellerker, Eſq; are deeply in it. Mr. Turner has made ſeveral experiments, which have cleared him above twenty pounds a year from each acre. I wiſh ſuch-like gentlemen as theſe were thicker ſown in England; ſuch ſpirited, judicious experiments might breed an emulation among farmers to follow their example, particularly if they would minute down their proceedings, and make known their profits.

When cabbages are a good crop, a ſingle cabbage, leaves included, will weigh from thirty to forty pounds, excluſive of the ſtalk.

The worſt enemies that cabbage has are caterpillars; I have ſeen many acres deſtroyed by them; the method to kill them is, to take ſome wet hay in a frying-pan, and mix among it brimſtone beat to powder; ſet this on fire, and go at the windward-ſide of the crop, when there is very little wind, holding your hand low, ſo that you ſee the ſmoke go among the cabbages.

If you do this judiciouſly, it will effectually kill them; you may ſee them fall off, and die immediately.

This is alſo a good way to fetch them from your fruit-trees, and all ſorts of garden-ſtuff; I have made them tumble off like ſhowers of rain.

CHAP. XVII.

On the Culture and Perfection of TURNIP CABBAGE, and other CABBAGES, as Food for Cattle.

THE turnip-cabbage is a ſpecies of cabbage; but ſomewhat different from it, both in ſhape and taſte. I do not think it very agreeable to be eat with meat as greens, particularly to an Engliſh palate, who has ſuch a variety of garden-ſtuff; however, it has one perfection not found in any other vegetable I ever ſaw; and that is, its bearing a great deal of hardſhip; for I once eat ſome at a gentleman's table, that had been lying in the garden-walk all winter; which, though not very palatable, yet was not diſagreeable: it was much better than any I had taſted, when uſed at any other ſeaſon, green from the root. It was reduced to a ſoft pulp by boiling, and was quite clear of ſtrings, and not woody; this ſhews that it improves by keeping; and this too without care, in a hardy manner; which makes it the moſt valuable plant I know, for winter or ſpring-feeding, for cattle or ſheep. I ſay, in this it muſt be ſuperior to all others yet found out, in two or three caſes.

Firſt, becauſe it will laſt good till March, April, and May; when all other vegetables are ſcarce; and at a time too when ewes and cows (particularly) are wanting ſuch juicy food, to create milk.

Secondly, the tops can be eaten in December, and the bottoms may be laid in a dry meadow till ſpring; which, perhaps, they may be as well, or better, than if taking up houſe-room; and the land where they grew can be winter-fallowed, and got in good condition for a ſpring-crop.

Thirdly, they have a firmer texture than turnips, and lie longer in the cattles bellies; therefore muſt be a ſtronger food ſood to work upon, for bullocks in the plow, or the like.

Theſe are all conſiderations which plead greatly in their favour, and ought to make them greatly regarded by every farmer; ſo as to induce him to cultivate ſome, at leaſt, to ſupply the place of ſuch vegetables as will not laſt good till ſpring. It is a perennial, and a ſpecies of both the turnip and cabbage; its leaves are large and ſpreading, and greatly like thoſe of a winter-cabbage; the turnip part grows above ground, of an oblong ſhape, much like a Norfolk-turnip that does not turn well; its colour is much like that of a cabbage-ſtalk, a paliſh green. It may be cultivated on good land to weigh fifteen or ſixteen pounds; it ſeems to flouriſh much in a black, light, rich, boggy earth; for I planted a quantity in a reduced bog, where there was turf-graft five feet deep under it; and I had a fine promiſing crop; but my cattle broke in, and eat them all, except a very few, of which one came to be above fifteen pounds weight. But the beſt crop I ever ſaw cultivated in the field, for the food of cattle, was by Mr. Baker, who acts under the patronage of the Dublin-Society: indeed, I believe he is the firſt that introduced them as a field-huſbandry-crop; and he makes ſome very ſenſible remarks thereon. He hints, that they would be very valuable, as a vegetable, for ſailors in long ſea voyages, and, in all likelihood, would prevent the ſcurvy; and to appearance, I am pretty clear he is right; for ſince I have taken notice of this plant, I always find it better for keeping. It is not long ſince I boiled one that was eighteen months old, and it was very good.

The world is greatly obliged to Mr. Baker, for his uſeful hints. I have the pleaſure of being ſlightly acquainted with him, and think the world cannot value him enough for his candour, ingenuity, and indefatigable induſtry, in trying experiments on agriculture.

Mr. Baker ſowed his turnip-cabbage in drills; which crop produced about twenty-ſix tons on an acre; but I am of opinion, that if they were tranſplanted in the diagonal form, with the tranſplanting machine, one upon every ſquare foot, an acre would produce above fifty tons weight, at a very moderate computation; but then the land muſt be well tilled; and if it be plowed and harrowed immediately before the plants are ſet, there is no doubt but they will effectually keep down the weeds with once hand-hoeing in July.

The turnip-cabbage is managed in every degree as any other cabbage. The ſeed muſt be ſown the firſt of March, on a ſeed-bed finely prepared. It is too much trouble and expence to prick the plants out, for a large plantation; and they will do full as well by ſowing them thin on the ſeed-bed; and if you find they grow in lumps, then thin them by weeding, and prick out the ſuperfluous plants.

The middle of June is the beſt time to tranſplant them out; however, it is better to alter a week either way, to ſet them in, or before a ſhower of rain, if poſſible, rather than in a dry time.

Put them as deep in the ground as the leaves will admit, and cloſe the ground well about them.

If you ſet them in the diagonal form, you may draw a little earth about the ſtems with a hand-hoe, about the beginning of Auguſt.

This cabbage does not take up more ground to grow on, than the common turnip; therefore need not be hoed to a greater diſtance.

CHAP. XVIII.

On Six-rowed BARLEY.

THIS is a ſpecies of barley that is very ſcarce in England, neither do I know whence it originally came.

I by great expence and trouble, procured four ears, which produced two hundred and eighty grains, which I ſowed on a piece of lay ground, that was trenched without manure: the fifteenth of April laſt, I dibbled it in, twelve inches between the holes, and three grains in every hole.

When I got the ſaid four ears, they were very green, and by keeping them long in my pocket, the grain ſhrivelled up to be very ſmall; ſo that I was afraid they would not grow; being very dry, I ſteeped them in my pickle, twenty-four hours; then as directed in this work, I candied, or coated them over very well with the compound manure; and I believe every grain grew. Field-mice would ſcratch to the grain, but leave it there.

Thus far it eſcaped from waſte, grew up, and flouriſhed greatly; each grain ſtooled or branched out from twenty to fifty ears, but juſt as it was ſhooting into ear, I had a mare tethered in the ſame, which broke looſe, and cropped every root; which vexed me more than if the mare had died, which coſt me thirty pounds; becauſe I did not know where to get as much more, were I to give an hundred pounds for it; however, contrary to my expectation, a great deal of it ſhot out, and grew a ſecond time; but the forwardeſt ears which were ſhot, grew no more; therefore I computed, that about one half of my crop was loſt by this miſchance.

When it got into ear, what with people going to ſee it, and plucking it, and birds and mice feeding upon it, I loſt a great deal more. This obliged me to ſhear it before half-ripe, or I found I ſhould have little left; notwithſtanding all this, I really believe I have two thouſand-fold for every grain I ſowed. I have as much as will ſow an acre, by the ſame method that I took laſt year.

In ſhort, it is of the greateſt produce of any grain I ever ſaw: I promiſe myſelf a great deal of ſatisfaction from it.

The ear conſiſts of ſix regular rows; the grain is cloſe ſet; each row contains from ten to ſixteen grains; but moſtly fourteen.

The grain is as bald, ſhort, plump, and thin-ſkinned, as the two-rowed ſprat-barley.

The beſt account I could get of this barley, after riding about two hundred miles in purſuit of it, was from an old clergyman in Kent.

Says he, about twenty-five years ago, being curious and fond of farming, I, by chance heard of this barley, and procured a ſmall quantity, which brought me quickly into ſtock. I ſowed it on a ſtrong cold land, and had a great return, above double the quantity on an acre, that I had from other barley ſown on the ſame ſort of land, and with the ſame ſort of tillage and management.

It is not nice in its choice, but will grow almoſt on any ſort of land; and is ſo generous as to give a good return.

When I gave over farming about twenty years ago, I ſold my crops on the ground; a good deal conſiſted of this ſort of barley, the farmer ſent it to the malt-houſe, therefore the ſeed was loſt, none being ſown ſince to my knowledge.

This is all the ſatisfactory account I could get. I went, by this gentleman's direction, to the farm where the barley formerly grew; but the ſeed was entirely loſt; as no farmer in the neighbourhood had any remains of it, though moſt of them had heard of it, yet their ideas were ſo confuſed, that I could get no further ſatisfaction than what the clergyman gave me.

CHAP. XIX.

Shewing how CATTLE, lays on Fat and Lean, &c.

IT is not the quantity, but the quality of food, that the beaſt takes in, which is of efficacy enough to ſuſtain the appetite from hunger, that gives life and vigour to the animal ſpirits, and which lays on fat and lean.

It ſignifies nothing, if a beaſt eat ten ſtone of hay, if that quantity contain no more ſpirits or oily qualities, than what might be expected in one.

Such a bulk only ſerves to paſs through the bowels, and augment the dung-hill, without adding to the fat or ſubſtance of the carcaſs.

The heat of the body, in all animals, performs the office (as it were) of a refiner's furnace. The food, when taken in at the mouth, is a mixture of dead matter; ſome abounding with a greater quantity of rich oily ſpirits than others do.

The food being entered into the maw, (a place by nature deſigned for a repoſitory) there it lies on a heap, till it begins to heat or ferment which is its firſt ſtage.

The next is a putrefaction, which divides and thins the groſs matter by degrees, and diſperſes it into narrower paſſages; then it undergoes a greater degree of heat, which farther thins it all into a fluid matter, ſo that it can eaſily empty itſelf into the ſmall bowels; and, while in this ſituation and liquid ſtate, the heat is ſo extremely great, that it brings on a complete rarefaction, and the thin, rich, ſpirity vapours thereof penetrate through the ſkin of the bowels, and riſe in a ſteam, like the ſmoke of a tallow-candle, to the different parts of the body, where nature deſigned them.

Not but there is, in ſome degree, a diſcharge of this rich matter through the incloſure of the bowels, in paſſing all the ſtages from the maw to the extreme part; but that which is moſt complete, is, while in the fluid ſtate, in the ſmall entrails.

When it has undergone this rarefaction, the dry, barren, groſs particles begin again to unite, and grow drier and drier, till they are diſcharged as dung.

There is another obſervation which I ought to make, which is, that no animal, before it comes at the meridian of age, or growth deſigned by nature, will feed or lay on any quantity of tallow or fat.

The reaſon is, becauſe the ſinews, fleſh, and bones, are open and porous; which admits the oily fluids to enter thereamong, by which they are inlarged, and which takes up ſo much of the oily ſpirits, that there cannot be a ſufficiency to lay on fat too; but when the creature comes at its proper age and growth, the bones, &c. are grown to a very firm texture; the grain or ſurface thereof is cloſe, hard, and callous, and ſo conſequently will not admit the evaporating oily fluids. In ſuch a caſe they cling together about the inner ſurface of the body, ſuch as the kidneys, kell, &c. juſt as if we were to burn a great deal of tallow in a cloſe room, for want of vent the room or walls thereof would quickly be covered over with ſoot, which is no other than the tallow itſelf, only that it has undergone a change in the nature of its colour.

I can ſcarce mention this, without bringing on another piece of natural philoſophy, which is rather foreign to the ſubject; however ſince I am ſo far, fewer words may ſerve.

The colour, in moſt caſes, ariſes from friction, which alſo begets heat; if the heat be raiſed to a great degree, the colour is red.

Blood is the hotteſt fluid in the body, and alſo the reddeſt; and it undergoes the greateſt friction of any other fluid in the body, on account of the quick and teeming motion through the veins and arteries; and when any creature is more than commonly agitated in the motion of the body, the blood runs quicker, the friction thins it, and it is ſtill of a livelier red.

On the contrary, if the creature be cold or dull by nature, ſo as to be ſlow in motion, or if the animal frame be out of order by catching cold or the like, the fluids are, in ſuch caſe, all deadened and ſlow in their motion, inſomuch that the tallow or fat will be changed in colour, from a white to a darkiſh grey-caſt; and the blood, inſtead of a florid red, will be almoſt black; becauſe the friction is ſlow, the animal ſpirits are thick, heavy, and languid, and the heat in the body abates in proportion.

All this proves, that theſe colours are cauſed by heat and friction; it is eaſy to make water white by friction, and to raiſe it into a degree of heat too, by beating it about with a whiſk, which raiſes a froth; and that froth is white.

Snow is no more than water, raiſed into a froth by friction, or being toſſed about in the firmament; and while in that frothy ſtate, it is hotter than common; then ſuddenly comes a cold eaſterly wind, which congeals or binds up the particles, and conveys them into our region, in that white frothy ſtate, as ſnow.

When any animal grows old, its blood and fluid matter abates in its motion, and as age creeps on, it yet abates more and more; it runs cold, ſlow and languid; therefore the heat through the body abates in proportion, till it comes ſo low, as not to have ſufficiency enough to cauſe a rarefaction, or ſeparation of particles, to ſupply the animal ſpirits.

Inſtead of that, the food is diſcharged through the body, before it is (what is vulgarly called) well digeſted; becauſe the body has not in it a ſufficient heat to cauſe the ſaid rarefaction.

Moſt creatures, when they grow old, or are cold in conſtitution, have generally a large belly; and ſo have ſuch as live upon unwholeſome, or poor, ſpiritleſs food.

I hinted, in the beginning of this chapter, that it was not the quantity of food, but the quality of it, which ſatisfies the cravings of appetite; ſo it is; for we generally ſay, when any thing is rich and luſcious, that it is cloying to the appetite; that much of it cannot be eat, &c.

The reaſon is, becauſe the abundance of the rich oily ſpirits which it contains, evaporates into the body, and ſatisfies the cravings of nature, though the bowels be left almoſt empty; cattle which live on ſuch rich food, have generally ſmall bellies.

On the other hand, cattle have large bellies, from ſeveral cauſes.

Firſt, from the food being barren of richneſs enough to ſatisfy the appetite, by evaporated matter, as aforeſaid; therefore the creatures are ſpurred on (as it were) by the cravings of appetite, to eat a great deal, till they ſwell the belly, and ſtretch the ſkin to a great ſize, in order that out of abundance of groſs matter they may diſtil the more refined matter

ter to ſatisfy their cravings, for nature always ſpeaks for itſelf.

Secondly, as a beaſt drops into years, the ſize of the belly increaſes; becauſe the conſtitution grows colder; for, when fruit is full ripe, it will not ſtay long in that period, but will naturally decay.

Every animal is either going up or down the hill of life; when going down, the blood abates its former rapid motion, the friction in the veins and arteries is not ſufficient to keep the fluids hot, ſo that the interior parts of the whole machine abate of their uſual heat, not having ſufficient to diſtil, ſeparate, or rarify the rich oily particles from the groſſer matter. The cravings of the appetite ſpur the creature on to eat, till the belly is enlarged beyond its uſual bounds; for the hunger is allayed from a ſufficiency of theſe rich avaporating qualities, and not from a great belliful of dry barren matter.

In like manner, when a creature, by any accident, has got a cold, that the air has imbibed through the exterior parts, and got impregnated among the fluids, the blood is thickened and cooled therewith, ſo that the heat of the body is not ſufficient to perform its uſual office of a complete ſeparation of particles; and though the creature may eat a great deal, yet the food will go through it without performing its office of fattening and ſtrengthening the body.

Farmers, generally, call ſuch-like cattle, ill-thriven creatures, they put their meat (ſay they) into an ill ſkin, for it does them no good, and ſuch-like ſtuff; not conſidering from whence it ariſes.

Cattle, in ſuch a habit of body, may not be abſolutely ſick, and may ſubſiſt a long time; though without being of much benefit to the owner, till the cauſe is removed; which ought to be done by hot nouriſhing drinks, and they ſhould be kept on ſuch food as is rich, and eaſy of digeſtion.

CHAP. XX.

On feeding CATTLE, &c. Shewing a cheap Food for laying on TALLOW, never before made public.

IF my reader has looked over the foregoing chapter, he will the ſooner perceive which ſort of food will expedite the feeding of his cattle quickeſt and cheapeſt; a conſideration every one ought to bear in mind.

The quickeſt feeding a beaſt can take, is linſeed-oil and bran mixed.

If the cattle be but ſmall, give each two pecks of bran a-day, divided into three feeds; which will ſerve morning, noon, and night; into each peck put half a pint of linſeed-oil; mix it well.

The cattle will eat it very greedily; and it feeds them paſt conception; they muſt have what hay they will eat, but that will not be much.

The oil dilutes all the reſt of the food they eat, and as to itſelf, it all ſtays in the beaſt as fat.

Five gallons of oil, which will only coſt about ſeventeen ſhillings and ſix-pence, and the bran in proportion, will fatten a beaſt ſooner and more effectually, than five pounds expended in any other food whatever.

It is well known in Wiſbich, that a gentleman of the faculty in that town, fed a ſmall beaſt with this food, which produced twenty ſtone five pounds of tallow; and the four quarters only weighed thirty-three ſtone; ſuch a weight of tallow in ſo ſmall a beaſt was prodigiouſly amazing; I have known it, in a manner, perform wonders with my cattle, in fattening them very quick; but nothing equal to this I have as yet to boaſt of.

Another method I take is, to mix two buſhels of bran to one buſhel of malt cums, and one buſhel of peaſe-meal; when all are mixed well together, and laid in a heap, ready for uſe; give each beaſt a peck at a feed, every night and morning, with half a pint of linſeed oil, mixed in each feed, juſt before you give it.

Moſt ſtock-maſters know that linſeed-cakes, from the oil-mills, are good feed for cattle; yet it is nothing equal in value to the aforeſaid food; becauſe there is a richneſs in the bran, &c. far ſuperior to the huſks of the linſeed; for, when the oil is all extracted, the huſks are of no uſe.

Such cattle as are fed upon theſe cakes, can be ſaid to feed upon nothing but oil, which they contain, and which the mill could not extract.

But admitting that cakes were as good food as oil and bran, (which they are not) yet

yet the food cannot be general; it can only be practiſed in a very few places, near oil-mills; as it is of too heavy and bulky a nature to admit of diſtant land-carriage; whereas the oil, bran, &c. can be procured all over the kingdom.

After what has been ſaid, it appears plain, that every ſort of food is of value, according to the quantity of oily rich ſpirits it contains; therefore I would adviſe every ſtock-maſter, or farmer to pay due regard thereto, by providing food of the richeſt kind, for either his cattle or horſes, particularly for ſuch as he intends to feed; if the food be good, leſs will ſerve, and the cattle will be handſomer in ſhape, and their bellies will be ſmaller; a large one looks very diſagreeable, either in the horſe or cow-kind; and it is chiefly the poorneſs of the food which cauſes it.

Keep a horſe on hay alone, and he will have a great belly; but give the ſame horſe a proper quantity of corn, and it ſhall reduce it to a moderate ſize. If this was not the caſe, hunters and running horſes would have as big bellies as other cattle; but it is rich feeding which keeps them in proper ſhape.

The ſame obſervations alſo hold good as to graſs-land; therefore, when a farmer wants to take a piece of ground, he ſhould take notice what condition the cattle are in, that go thereon; if their hair be long, rough and ſtickling, and their bellies large, he may reaſonably conclude the land to be poor and ſpiritleſs, the graſs it throws up to be deſtitute of oils or richneſs, ſufficient to ſatisfy the cravings of appetite, without taking in a great deal of groſs matter for that purpoſe.

On the other hand, if the cattle upon the land be ſleek and ſhining, the hair ſhort and lying cloſe, and the belly round, and ſmall, almoſt like that of a running horſe; all theſe are plain and ſure tokens, that the ground on which they go is good, and the graſs rich and oily, which evaporates,

porates, penetrates, and enriches all the fluids of the body, and keeps them thin, hot, and lively, ſo conſequently the body in health and vigour.

CHAP. XXI.

On DITCHING, PLANTING QUICKS, &c.

IT is very ſtrange, conſidering ſo much incloſing, and land improvements as are going on in England, that the proprietors thereof ſhould be ſuch great novices in making fences for that purpoſe; in ſhort they go to great expence, to create yet more both expence and labour.

The Iriſh gentlemen have much the advantage of the Engliſh, in this point of improvement. When they make a fence, it is almoſt everlaſting, and yet not half ſo expenſive. I have heard ſome Iriſh gentlemen, (who had travelled through England) ſay, that they ſcarce ever ſaw a good fence there.

This may be going a little too far; as the grown up quicks may be a good fence; but, however, this I can ſay, that there is not a piece of new fence in England (that I ever ſaw) to compare with what is generally made in Ireland, though much more expenſive.

The general method in England is, to incloſe with poſts and rails. They ſet two rows, one at each ſide the quicks, about ten or twelve feet aſunder, and the quicks placed in the middle.

They make a ſmall drain at one ſide, perhaps three feet wide, and two deep, laying the ſods up to the firſt or bottom-rail, at the outſide of the incloſed part, commonly called the fence-ſide.

Before they ſet the quicks, they turn up a ſod a ſpade graft deep, and perhaps two feet broad; in this they plant the quickſets, placing them upright, each ſet three or four inches aſunder.

This is the Engliſh method of incloſing; and a very expenſive one it is; as the poſts and rails come very high, even in the cheapeſt part of the kingdom, where wood is moſt plentiful. I know ſome parts, where this method of fencing coſts five ſhillings a perch, at leaſt, the firſt expence; and if the quicks be done juſtice to, the expence of weeding is great; as they have no advantage over the graſs and weeds, but grow promiſcuouſly all together, therefore ought to be weeded two or three times in a year; and if it happen to be in an open country, where ſhelter is ſcarce (which is generally the caſe upon all new incloſures) the quicks are expoſed to the inclemency of the weather from all quarters.

The eaſt and north-eaſt winds moſtly, which bring a blighting froſt along with them, wound the tender leading buds of the quicks, and make them grow runtiſh, cankered and dwarfy; this is the greateſt miſfortune that either quicks, or any foreſt-trees can fall under. It matters not how bad the land is; ſo as the tender plant be kept warm and dry, while young.

I follow the Iriſh method of making fences. Inſtead of poſt and rails, I throw up a ditch (if in ſandy land, which is apt to run) nine feet wide, and eight deep; but in ſtrong, wet, clay-land, where the banks will ſtand with a leſs ſlope, I make them only eight feet wide at the top, and eight feet deep; but in any ſort of ground, the ſides of the ditch muſt be ſloped till the bottom is only the breadth of a ſpade wide, for the conveniency of ſhoveling out the laſt looſe earth.

The narrower any drain is at the bottom, the better; becauſe the water is gathered more to a-head; by which means the current or motion of the water is kept quick; which prevents the graſs from growing, and alſo the cattle from walking therein.

A bank muſt be made, with the earth that comes out of the ditch, ſtill keeping the ſame ſlope to the top thereof.

It is the Engliſh method, in making a bank, to cut the ſods, ſo as to fit one another, and make the face of the bank with the graſs-ſide outwards; this is a bad way; for when the graſs grows, it encourages the cattle to climb up with their fore-feet, to eat it; which breaks the foundation, and then the top ſoon follows.

To avoid this, as well as to prevent the graſs, weeds, &c. from choaking any quicks, trees, or the like, that may grow in the hedge, we ought to take every precaution, not to let ſuch enemies take root in the bank; therefore, inſtead of laying the graſs-ſide outwards, the beſt method is to bury the ſods in the heart of the bank, and lay the ſecond ſpit or dead earth, which comes from the bottom of the ditch, and which has no roots in it, on the face of the bank.

The bank muſt take its footing three inches within the back of the ditch, on this kind of a ledge or ſhelf. You muſt lay the firſt row of quicks flat on a ſide, with the tops outwards, hanging over the ditch; you muſt cover the roots up with dead earth, and which is the foundation of the bank; but before you lay the quicks, turn the ſod they lie upon, the graſs-ſide downwards, to prevent its growing.

It is better to have two rows of quicks, though the ſets be no more in number than what might be in one. Suppoſe you would have the ſets to be three inches aſunder in one row; in this caſe lay each ſet in the firſt row ſix inches aſunder; then cover them over three inches thick with mold; then lay upon it another row, ſix inches between each ſet; obſerving that each ſet in the top-row fall even in the middle, between each ſet in the bottom-row, in this caſe, each quick in the bottom-row grows up in the center between each quick in the top-row; and the roots not being crowded, but having more mold between them, flouriſh better.

This method has four times the advantage of the common Engliſh method, even in quicks growing.

Firſt, as the quicks lay flat on a ſide, the ſhoots ſtrike out cloſe to the root, and to the ſurface of the earth, and alſo throw out more of them; therefore the hedges will never be naked or open at the bottom, as when they are planted upright.

Secondly, the ſods being ſmothered in the body of the bank, rots and turns to manure for the quicks to feed on, which will make them flouriſh amain.

Thirdly, the bank, being all made on dead mold, has no roots in it to throw up graſs, weeds, or the like, to choak or retard the growth of the quicks; therefore it will want little trouble in weeding, and before they get footing, the quicks will get out of their reach.

Fourthly, the bank, which is ſix or ſeven feet high, is a good ſhelter to keep them warm, and will make them flouriſh ſurpriſingly, particularly if it be made to the eaſtward of them, ſo as to fence off the cold winds; which muſt always be the caſe, if it be poſſible that the nature of your incloſure will admit of it; and this can always be done in any inner parts of a domain; ſo that there is only one fourth part of a ring-fence that need be expoſed thereto.

The ditch, of itſelf, is, at firſt making, a better fence than rails; and it will maintain itſelf for many years. The poor hedge-breakers cannot carry it home to burn; the hunters can do it little hurt by their leaps; and the cattle cannot come at the quick, to crop it, till it is old enough to value them not.

The bank alſo is an immediate ſhelter for cattle, to lie under.

The back of the bank muſt be carried up ſloping, and with a ſharp edge at top; ſo as a beaſt cannot ſtand thereon. The back of the bank may be ſown with graſs ſeeds; ſo that the cattle may graze as far as they can reach.

In ſix or eight years, when the quicks are large enough, the bank may be ſet with potatoes; and being well dunged for the crop, they will mellow and enrich the earth, and when they are taken out, you may plow the bank down, and mix therewith a layer of lime, and another of ſalt, &c. which will make a good heap of compoſt, to lay on your meadow or other graſs-ground, for a trifling expence.

All the foregoing advantages muſt appear in favour of this method of fencing; but yet there remains another prevailing argument, which is, the ſaving of expence; for a ſeven and eight feet ditch may be made, the quicks ſet, the back of the bank ſloped up, and all completely finiſhed for twenty-pence a perch, in any part of England, and in ſome places, and in ſome ſorts of ground, for much leſs.

In ſhort I know the difference of the value ſo well, that I would not take a hundred pounds in hand, for what I have to do, to be obliged to follow the preſent Engliſh method of incloſing, and fence-making, in preference to this.

CHAP. XXII.

On planting, in general, FOREST-TREES of all Sorts.

THE improver is to conſider planting in two different lights, one for pleaſure, and the other for profit; but if he have a taſte and judgment, he may join them both together, and fetch profit out of pleaſure.

The pleaſure conſiſts in judiciouſly tranſplanting a mixture of various ſorts of trees, ſo as to make a diverſity of ſhapes, ſuch as ſerpentine walks, clumps, groves, hedge-rows, &c. ſome to come early into bloſſom or leaf, and others late; ſome of one colour, and ſome of another. When a wood, grove, or hedge-row, is thus variegated with objects differing in colour and ſhape, it gives delight to the eye, and pleaſure to the mind, but doubly ſo to thoſe who have a contemplative turn to muſe upon the works of nature. What can be more delightful, or even heavenly, than for a perſon of buſineſs to retire from the cares of the buſy world, a few hours, into a well planted grove? There every object he ſees invites him to contemplate upon the works of his creator.

The feathered creation alſo are warbling out their various notes, in their maker's praiſe, and telling man (the favourite work of God) that they were all created for his pleaſure. A poet might well in raptures break out as in the following lines:

My God I love, and I adore!
But ſouls that love would know thee more,
Whilſt I for ever hide, and ſtand
Behind the labour of thy hand;
Thy hand unſeen ſuſtains the poles,
On which this huge creation rolls!
Thy ſtarry arch proclaims thy power,
Thy pencil glows in every flower;
In thouſand ſhapes and colours riſe
Thy painted wonders to our eyes;

While beaſts and birds, with lab'ring throats,
Teach us a God in thouſand notes.
The meaneſt pin in nature's frame,
Marks out ſome letter of thy name.
Where ſenſe can reach, or fancy rove,
From hill to hill, from field to grove,
Acroſs the waves, around the ſky,
There is not a ſpot, deep or high,
Where the Creator has not trod,
And left the footſteps of a God.

If a planter wiſh for both profit and pleaſure, he muſt plant a mixture of ſeveral ſorts of trees, and place them in ſuch a manner, that they neither intercept his view, nor take up his ground (ſo as to prevent its producing its ordinary courſe of crops) and that, at the ſame time, they be agreeable objects, to attract the eye, and enrich his pocket.

The fancy of man in plantations, (as in moſt other things) has changed much, within theſe few years laſt paſt.

The taſte was, formerly, to plant all in long cloſe rows, at each ſide of an avenue, or in hedge-rows, or in woods; but the method is now, to plant in round, ſquare, or angular clumps, in different parts of a domain, at a diſtance from the manſion-houſe; and alſo to plant odd trees in a ſcattered manner, up and down lawns and meadows, near the houſe; ſo as not to obſtruct any proſpect, and yet to make the place look warm and ſheltered.

This taſte is extremely agreeable to the eye, and alſo profitable, becauſe the trees are augmenting in ſize, by feeding under-ground; and, at the ſame time, the ſurface is producing any crop the owner pleaſes, particularly if he makes choice of ſuch trees as feed deepeſt in the earth.

In this caſe I would have him guard moſt againſt aſh; it being a tree which, though very uſeful and profitable, yet is a great impoveriſher of the corn-mold, as it feeds near the ſurface of the earth; neither is it a tree for beauty; as it comes the lateſt into leaf or ſeaſon, and goes the ſooneſt out. It ſhould be planted by the ſides of high-roads, commons, or ſuch like waſte grounds.

The oak is the beſt tree that can be planted in a lawn, meadow, or plowed ground; becauſe it feeds deep, and therefore does not impoveriſh the ſurface; and, if in ground that is under tillage, the plow can (without obſtruction) go near the trunk.

The ſmall-leafed elm is an excellent timber, alſo a quick grower, and a profitable tree; it ought to be planted in hedge-rows; as it will bear planting cloſer together than any other tree. It has an aſpiring head, and grows beſt when the boughs are lopped off near the trunk; in this caſe, it does little damage to any underwood that may be under it.

The following is a liſt of trees that are proper to be planted intermixedly in lawns, meadows, or pleaſure-grounds, viz. oak, Engliſh elm, beech, Scotch fir, ſpruce fir, ſilver fir, New England pine, horſe-cheſnuts, walnut, poplar, ſycamore, larchs, black-cherry, apple, and white thorn-tree.

Theſe, being properly mixed, will give a diverſity of colours and ſhapes, very agreeable to the ſpectator, and every one be uſeful in their turn.

In order to imitate nature, as near as poſſible, they ſhould be placed very irregular, and likewiſe ſo thin, as not to obſtruct any proſpect, except ſuch as are diſagreeable, as a rock, a barren bit of land, or a marl-pit, a quarry, or the like; all ſuch as theſe ſhould have a clump planted before them, to hide them from the eye.

As to all diſtant monuments, valleys, woods, rivers, fiſh-ponds, towns, churches, caſtles, antique buildings, &c. theſe are agreeable objects, and ought not to be obſtructed from the eye by any home-plantation.

As to the method and time of planting, it varies much; ſome will recommend Michaelmas-planting for foreſt-trees, and others the ſpring.

Trees, planted in either ſeaſon, may do well; but I find by experience, that the beſt time is, when the ſap is riſing, viz. from the beginning of March to the end of May.

The month of May is as good a time as any in the year, to plant evergreens in, ſuch as fir, larch, &c. In ſhort, I have ſeen elm-trees, thirty feet high, removed at Midſummer, which all throve very well; they were removed and inſured by a very ingenious, experienced gardener; he was to receive two ſhillings a piece, for every tree that lived; but was to forfeit a guinea for every one that died; and he told me, that he found by experience, that it was ſafer to remove trees in ſummer than in winter; provided they were not long out of the ground, and a ball of earth were taken with the root, and they were well watered, for two or three days at firſt, till they took root.

The beſt way of planting them is, not to dig a hole, as is uſual, but to ſet them upon the top of the ground, and dig a grip round each tree, at about three feet diſtance; and with the earth that comes out, you muſt cover up the roots; which will form a little bank or hill round the tree-root; but before you ſet the tree upon the ſurface, you muſt turn the ſod (it is to ſtand on) the graſs-ſide downwards; then the roots will ſtand upon the freſh mold.

This is not only an eaſy method, but alſo a very good one; becauſe the roots feed among the corn-mold; and when the ſod rots it turns to manure about the roots, and encourages the growth greatly. If the land be ever ſo poor in nature, yet they will flouriſh amain.

Being planted, the next care is to fence them from cattle; for if they be either cropped, or rubbed againſt, that retards their growth, and makes them runtiſh. In ſhort, a man had better never plant, if he does not fence from cattle.

But as the expence and trouble of fencing diſcourages many a one from planting, I ſhall

I ſhall point out an eaſy cheap method, to keep the cattle from the trees.

When trees are planted in open paſtures, the uſual method is, to ſet three ſtakes round the tree, in a triangular form, and nail three ſticks on the tops of them, and then faſten thorns therein.

The beſt method is, to avoid all this trouble, and do no more than to tie two bunches of whins (ſo far as the cattle can reach) round the trunk of the tree, with a thumb-rope made of hay or ſtraw; after which, daub a little cow-dung over each rope; which will prevent them from eating it. If whins be not to be had, ſmall ſharp thorns will anſwer the end; but cut off all thick ends; for if ſuch preſs hard againſt the bark of the tree, it may be hurt therewith.

This is a very cheap ſimple method, and anſwers the end better than poſt or rails ſet round, particularly for all trees that are ſix feet high and upwards; and, indeed, none of a leſs ſize ought to be tranſplanted out of the nurſery, particularly into lawns, meadows, and ſuch like open places, where cattle comes. In fencing the trees thus, take care not to put on over-much whins or thorns; five or ſix pounds weight, if properly placed, with the prickly ends outwards, will anſwer the end as well as ever ſo much.

When moſt ſorts of foreſt-trees are planted, the ſide-branches ought to be lopped off; but the tap-branch, which is called the leader, muſt be carefully preſerved from any hurt; for, when this is gone, the tree is not worth much. If wind, froſt, or any accident, wound or break a leader of a tree, it is the beſt way immediately to root it up, and replace it with another; as the expence of a tree is a trifle, in compariſon of loſing two or three years growth, and the beauty of the tree alſo.

Oaks will bear this miſchance better than any others; but as to elm, fir, or larches, if the leader be gone, they are not worth a farthing. The lime-tree is generally planted more for beauty than profit; therefore cutting its top off rather adds to its beauty, though indeed not to the value of the timber.

A great many planters, thinking to do the work more effectually, prop their new-planted trees with ſtakes, drove into the ground at each ſide; but this, I think, rather does more hurt than good; as, from all the obſervations I have made, I ſee more crooked trees growing from this method, than when left to chance; and the thing accounts for itſelf; for one cannot drive a ſtake down ſo faſt, but one windy day will work it looſe, having only one leg to ſtand on; and, when once looſe, it does hurt; becauſe the tree has the weight of the ſtake to bear; and, in a high wind, the tree and ſtake give way together; and when a tree bends from the wind, the ſtake acts as a prop to keep it in that poſition; as the ſtake has not any balance, ſpring, or elaſtic cauſe, to bring it back again.

Whereas, if the tree was left to itſelf, as it ſtands on a broad bottom, the roots act as ſhrouds, or ſtays round it; the earth laying thereon is a balance, to bring the tree back again, after it has been bended from the blaſt.

Beſides, except very great care be taken, the continual waving and motion of the tree wears any fence or lapping put between the ſtake and it, and admits the ſtake to rub againſt it, and wound the bark thereof; in this caſe, I need not tell the damage; every one knows it.

So that, upon the whole, it is much better to ſet the tree firm, by treading the earth about it well, and then leave it to chance, than to prop it up, though the tree be ever ſo tall.

As to ſoil proper for trees, I need ſay little about it; as few people in theſe days but what know that very well; particularly ſuch as riſe nurſeries, either for their own uſe, or for public ſale.

Beſides, were I to make a plantation on a piece of land, let it be of what ſort it would, I would plant every ſort of foreſt-trees thereon, intermixedly; only with this difference, that, if the ſoil was ſand, I would plant the greateſt quantity of fir or larch thereon; and if a ſtrong clay, the greateſt quantity of oak.

As to the wetneſs of the ſoil, this is immediately provided againſt by my method of ſetting the tree upon the ſurface, and making a grip round it; this puts low wet ground nearly upon the balance of that which is of a drier nature; and whoever tries it, will immediately find the good effects thereof.

CHAP. XXIII.

How to make a NURSERY, &c.

AS I would be as conciſe as poſſible, without being thought tedious in relating things which are generally known, I ſhall, therefore, in a few words ſhew the beſt method of raiſing a nurſery of foreſt-trees, from ſuch ſeeds as may eaſily be procured in the country by any country-gentleman or farmer.

When you have fixed on the ground for a nurſery, as this is ſeldom of a large extent, I would, by no means, adviſe trenching it with ſpades, at leaſt two ſpit deep; burying the upper ſpit (wherein are all the roots of graſs, weeds, &c.) at the bottom; this will prevent much of that trouble, that generally attends keeping nurſeries clear from weeds, graſs, and ſuch like real enemies to young plants.

The ground being thus trenched, and levelled with a harrow or a garden-rake, your next ſtept is, to determine upon as many ſorts of ſeeds as you would ſow, and make ſo many diviſions out, by either ſtakes, or bits of boughs.

After this, ſow your ſeeds, as intended, upon each diviſion; then lay out each diviſion in beds nine feet broad, and ſtretch a garden-line at each ſide, to guide you ſtraight; make a ſmall furrow, about a foot broad, and half a foot deep; and with the mold that comes thereout ſpread over the ridge, to cover the ſeed, which will be about one inch thick, and which is a ſufficient covering for any ſort of ſeed.

By this method (which is performed with little trouble, being nothing but a ſhovelling of looſe mold to ſpread over the bed) you ſave a great deal of ſeed, to what you would do by harrowing or raking in; becauſe, in this caſe, all the ſeed is covered at an equal depth, and ſo will come up more even altogether; and none of it lies expoſed to the fowls of the air; but, if harrowed, the pines let ſome in very deep, whilſt others lie above ground, for birds to carry off.

A very little ground, for a ſeed-bed, will raiſe a great number of plants; but at two, or at moſt three years old, the plants ſhould be pricked out into another nurſery, prepared by trenching, as the ſeed-beds were. If ſet in rows, eighteen inches aſunder between each row, and one foot in the row diſtant from each other, they will ſtand very well, to be eight or ten feet high, before they need to be tranſplanted out for good and all. They grow up ſtraighter, and have cleaner trunks; for being cloſe together in the ſecond nurſery.

CHAP. XXIV.

A new Invention to make a cheap, uſeful PIPE-DRAIN.

THIS is a very uſeful drain for wet or clay-land; and though cheap and ſimple, it will be found, upon trial, to be of as great utility, as were ten times the money or labour expended in French-drains, which are generally made by gentlemen, who, with the ſtrength of men and money, may do great things; but it is my endeavour, and I hope I ſhall not altogether fail in my purpoſe, to ſupply the farmer with ſuch contrivances as may in ſome degree make up, for the want of thoſe advantages.

I have two ſorts of theſe pipe-drains; one I ſpeak of in the third volume, of this work, to which I refer my reader; but that is only for meadow or graſs-grounds. The following ſort may be applied more generally for every ſort of land, whether plowing or graſs.

The firſt thing that is to be done is, to examine where the fall for the water lies; this is eaſily perceived by the outſide-drain which incloſes the field; for, in the loweſt place the water generally ſtands, it being the beſt leveller; into this all the pipe-drains muſt lead.

The way to make them is, firſt to plow a furrow, along every place where you intend the drains to be; then be provided with a ſort of a ſpade, (all iron, except the ſhaft) it muſt be made like a garden-ſpade; only that the mouth, or digging part, from where you ſet the foot down to the point, muſt be eighteen inches long; at the ſhoulder, where you ſet the foot, it muſt be eight inches broad, and go narrower all the way to the point, which muſt only be two inches broad.

With this you make a grip in the plowed furrow, which, together with the furrow, will be about two feet deep, and the bottom thereof two inches wide.

In performing the work, you need not cut down the ſides; but put the ſpade plum down, and throw out the earth; in this caſe, you never put down the ſpade, but you bring it up full.

There will be ſome looſe crumbling bits that will fall to the bottom; but as no common inſtrument can go to ſhovel them out, you muſt be provided with one on purpoſe, which is made in the nature of a gouge, the mouth of which muſt be two inches diameter; it muſt be put on a ſhaft, the ſame way as a turnip-hoe.

With this, you draw out the looſe earth, by running it on the bottom of the drain. I call this a ſcoop hoe.

The drain being thus made, you muſt be provided with ſticks, or thorns of any ſort, to lay lengthways in the drain, filling it about half-way to the top; then ſtrew over them any ſort of ſtraw, ſtubble, or bad hay.

Over this throw a little mold; then go with the plow, and turn the ſame furrow back into its former place; which finiſhes the work.

The whole may be done for about a penny a perch; and I will anſwer for it to perform the office in carrying off ground-ſprings, or any downfal of water, as well as any French drain that will perhaps coſt a ſhilling a perch; provided you keep up to the rules laid down; but if you exceed in the width, it is not ſo well; becauſe a greater weight of earth, and a wider bearing would naturally bear harder upon the ſticks, and cloſe them more, than when the bearing and ſhoulder are narrow; in this caſe very little weight comes upon the ſticks; and when the earth comes to be conſolidated, by treading it cloſe, it fits like a wedge; ſo that, after many years, when the ſtalks are rotten, the currency of the water will keep the tube open for a long time.

The narrowneſs of theſe drains may (upon a curſory view) ſeem, to ſome people, not ſufficient to drain very wet land. Indeed, I have often had it hinted to me by gentlemen who received their information only by theory; but experience, gained from repeated trials, proves beyond a contradiction, that they are very ſufficient to convey any downfal of rain or ground-ſpring, ſuch as generally are found in wet ſpewy land, into the ſide-drains.

Eſſex is as low a cold clay-country as any in England. A gentleman there, of my acquaintance, had a low wet farm, that he let for ſixty pounds a year; the farmer broke upon it.

I adviſed him to take it into his own hands, and drain it after this method; which he did; the land was chiefly grown over with ruſhes; therefore it let only at a low rent, which was about eight ſhillings an acre.

The landlord began to make pipe-drains at Michaelmas, when the farmer left it; and as the work was eaſily done, it was finiſhed by the ſpring-ſeed time. He made the drains about a perch diſtant from each other; all the ſtubble land he ſowed with oats, which proved the earlieſt and beſt crop in the neighbourhood; owing to the land being ſo dry, that he could go to work earlier in the ſpring than his neighbours. In ſhort, he made ſo great an improvement, that he told me ſince, he let the ſaid farm for eighty pounds a year.

The method of making French drains, is, to dig a trench two or three feet wide, and as many deep; then half fill it with looſe round ſtones; after which cover them with ſtraw; then throw earth over all, till it is level with the reſt of the ſurface.

CHAP. XXV.

On twelve different Sorts of WHEAT.

FIRST, Red Lammas,
Second, White Lammas,
Third, Red-bearded Wheat,
Fourth, Red Kentiſh Wheat,
Fifth, Long-ear'd Wheat,
Sixth, Grey Pollard,
Seventh, Great-bearded Wheat,
Eighth, Summer-Wheat,
Ninth, Double-ear'd Wheat,
Tenth, Yellow Lammas,
Eleventh, White-ear'd Wheat,
Twelfth, Egg-Wheat;

With a great many others, not worth ſpeaking of, being like ſome of theſe, chiefly ſimilar variations, and not diſtinct ſpecies; neither are ſome of theſe worth a farmer's notice. The two firſt are ſuitable for any land in the North of England, Scotland, or Ireland; and the beſt farmers in England prefer them to any other, being, as they call them, the kings of wheat. Indeed, I take the white Lammas to be the hardeſt of the two, and moſt ſuitable for cold land; but the red is the faireſt flour, and thinneſt ſkin, and a good yielder.

The ſummer-wheat is an early kind; for, if it be ſown in February, it will be as early as others that are ſown in autumn; therefore it might be uſeful, if the firſt ſhould miſs.

The next in value to Lammas-wheat is the long-eared wheat; this is a very great yielder, and of a hardy kind, that will anſwer very well for the cold heavy lands of Ireland, and North of England. I have had great crops of it; but it muſt be ſown thin, as it ſtools much; and, when thus thin ſown, it will produce an ear ſix or eight inches long. It is of the bearded kind, which annoys birds ſo, that they cannot prey upon it with pleaſure; therefore it preſerves itſelf; and I think it as good, if not preferable to any other for the North of Ireland, where the land is cold, ſtrong, and coarſe.

The egg-wheat will anſwer well in the South of Ireland, or in England, where the lands are light and ſandy: it is a tender, thin-ſkinned grain, and produces a very fine flour.

The Kentiſh wheat is a good ſort, and very near a-kin to red Lammas: Any of the other ſorts of wheat may grow here, tho' not with that ſucceſs. Were I to enlarge as much upon every different ſort, I ſhould ſwell this work beyond my firſt intention; therefore ſhall confine myſelf to what I have already ſaid, being the moſt proper for theſe kingdoms.

CHAP. XXVI.

Some Remarks between the old broad-caſt Huſbandry, and the AUTHOR's new mathematical Huſbandry, by which CORN-SEEDS or PLANTS may be ſet at a regular given Diſtance, with his new-invented MACHINE, &c. &c.

BY peruſing the following ſheets, my reader will ſee ſome intereſting advantages ariſe, peculiar to this new method of ſowing or tranſplanting at a regular given diſtance, or depth in the ground, each grain or plant in proportion to the richneſs or quality of the ground.

And as the ſaving of the ſeed and labour (in order to keep down the expence) ought to be the farmer's grand point in view, I ſhall ſubmit to his own impartial judgment the reaſonableneſs of the following argument, which is grounded upon experience.

I always made it my chief ſtudy, to eaſe the farmer from tedious labour, and expenſive perplexing methods; as I am ſenſible there is no merit in writing, or pointing out expenſive ones.

There is not one part in my work, that ſavours of expence above its merit in profit; ſome places, indeed, may ſeem eaſy and ſimple, which may perhaps (though the more valuable) be the very reaſon why ſome flaſhy prodigal gentlemen may not like it ſo well, as if more perplexed or expenſive.

As to food neceſſary for the vegetating of plants, I hope every candid reader will allow, that every ſpecies of ground differs in quantity, quality, and ſort of ſalts, peculiar to each kind of plant to feed upon according to its nature; which ſhews the neceſſity there is, to proportion the ground thereto, according to ſuch richneſs; and that cannot be done to perfection, except by a mathematical rule.

I have often heard unthinking men ſay, Give the land ſeed enough it is rich enough to bear it; which was the only method they could take to deſtroy their crop: becauſe, in ſuch land, there may be ſubſtance enough to throw up three times more crop than the ſurface could bear. For each ſtalk or ear requires a proper diſtance, to admit that circulation of air around it, which is neceſſary to keep it in health and vigour, in order to raiſe a ſound, large, healthy grain, and prevent a malady peculiar to a crouded crop, namely, mildew; which it is morally impoſſible to guard againſt, as long as we follow the preſent irregular method of throwing ſeed into the ground at random. For, ſuppoſe a man knew, both by reaſon and experience, how many grains of wheat would ſow an acre, or any given quantity of land, and be at the pains to count ſuch a number, and take them in his hand, and throw thereon, in the moſt careful manner he could deviſe; it is poſſible they would fall a regular diſtance from each other? Would not ſome be too near together; and other parts of the land be unſeeded?

This is the reaſon ſo much ſeed is thrown away; and it was always looked upon by every writer, as a thing impracticable, to place each grain at a given regular diſtance from each other, in the diagonal broad-caſt method, to come within any reaſonable degree of expence; and much more to remove corn-plants: but if, by the new-invented machine, theſe obſtacles are removed, then grain can be ſown with a ſmall expence, and with a mathematical certainty.

The next great point for a farmer to know, is, at what diſtance each plant ought to ſtand aſunder, according to the quality or richneſs of ſoil; and if he have one eye on the experiments hereafter mentioned, and the other on his land, it is almoſt impoſſible his crop can miſcarry, if he keeps up to the rules laid down; becauſe every grain is placed in one latitude, both as to the perpendicular and horizontal direction; therefore, by the ſame rule that one will come to perfection, they all muſt, that eſcape vermin; and this I have alſo guarded againſt; as may appear in its proper place.

The practiſers in drill-huſbandry experience the benefit corn receives from a mathematical rule, as it is healthy, ſound, and bold; and is alſo exempted from the caſualties that are attendants on the old broadcaſt method, namely, blights, mildews, and ſmallneſs of the grain, &c. which are moſtly occaſioned by the over-rankneſs of the crop, that alſo makes the corn lodge; and, what is moſt diſtreſſing, it is generally the beſt land that meets with ſuch diſaſters.

Indeed, the drill-huſbandry can only be called half a mathematical rule; becauſe by it we only aſcertain the diſtance between the drills, as in the lengthways of the drills corn falls confuſedly irregular, and each grain almoſt at touching; therefore though it has too much room one way, it is crouded another; conſequently each grain loſes half its value: for were it at liberty to ſpread and feed five or ſix inches round, it would certainly produce double the quantity of ears and corn.

I have often ſeen a drill-corn-crop lowered in its value, by being ſown too thick; therefore it is very clear, that ſowing corn by a mathematical ſyſtem, in the centre of each given diſtance, muſt be abundantly more certain of a crop; and the great ſaving of ſeed and labour adds ſtill to its value.

But he that follows this new huſbandry, of ſowing or tranſplanting corn regularly thin, with the machine, as directed in the following chapter, muſt bear in mind two particulars; firſt, that his land be well tilled, and kept clear of weeds;

or they will deſtroy his ſcheme, by preventing his corn ſtooling or branching.

In this caſe, trench-plowing will be particularly uſeful; as, without hoeing or any labour, it is ſure to be clean from weeds; and as the ſoil is wrought to a deep ſtaple, it will alſo add to the plants ſtooling.

The next is, the corn muſt be ſown earlier than common; becauſe it has (if tranſplanted) twice to vegetate, firſt from the ſeed, and again after tranſplanting; for upon a plant's being removed, it dies before it lives again, and therefore admits of perhaps near a fortnight's delay.

Likewiſe, when corn is ſown thin, ſo as to admit of ſtooling, (if it be not removed) it may be ſaid to vegetate twice, firſt from the corn, and again when it is weaned from the kernel; for at this time it has to force from the root new ſhoots or ſtooling-branches; and therefore admits of near a fortnight's delay in its growth, by making the additional ſhoots, in order to fill the ground deſigned for that purpoſe.

As ſome of my readers may be at a loſs to know, what I mean by corn being weaned from the kernel, it may not be amiſs to explain it.

Corn, in its dry ſtate, before it is committed to the earth, is a dead inactive body; but, immediately after, it attracts or imbibes the moiſture thereof, which ferments, ſwells, and raiſes it to life and action, by firſt forcing out the root from the thickeſt or eye-end, and the top from the ſmalleſt end: if the ground be moiſt, ſo as to ſupply it with ſufficient juices, it will break the ſkin in about five days; and the root will divide itſelf into many ſmall fibres, which are ſo many mouths to feed the blade.

Nature has directed them to ſearch equally round for food; for they ſpread their branches horizontally, inclining downwards: as ſoon as theſe are united, or begin to feed upon the earth, then nature tends upwards, and forces out the top in an upright direction (and a ſingle blade) to the height of about three inches; all this time (which takes up about fourteen days) it is feeding from the floury or mealy part; but as ſoon as that is exhauſted, the blade (which from the beginning had a joint or parting, though it did not appear) divides into two parts, and falls flat upon the earth, at each ſide of the root.

At this criſis, the corn is vulgarly called weaned from the kernel; and I make uſe of the word in ſeveral places, in order to be underſtood; but, however, the word is wrong adapted; for the floury or mealy particles are the kernel; and that, being grown into root and top, cannot be weaned from itſelf; in ſhort, it is weaned from nothing it aforetime had any connection with, but the ſkin or huſk; and this it leaves in a perpendicular direction, reſembling a blown egg, which will abide there a long time, before it rots or melts away; which (as I have taken notice under the article of ſmutty wheat) proves very plainly how eſſential a nauſeous ſtinking pickle may be, to candy or coat over the ſkin, in order to prevent grubs, or worms of any ſort, from wounding, or preying upon the root; which, certainly, muſt weaken the plant, if not kill it outright.

CHAP. XXVII.

The AUTHOR's new-invented MACHINE, and the Number of Grains and Weight of SEED-WHEAT neceſſary to ſow an Engliſh Acre; with the tranſplanting MACHINE, and what Number of Grains and Buſhels of SEEDS the ſaid Acre will produce, with Directions for Sowing and Tranſplanting, &c.

I Hinted, in the foregoing chapter, that, when corn is ſown in this thin regular method, it requires an earlier ſeaſon than when ſown thick; becauſe it has a ſecond time to grow or vegetate into ſtooling-branches; and if the plants be removed, they will be ſtagnated in the growing part about another week; as every thing, of the vegetable creation, upon being taken out of the ground, dies before it lives again.

This makes it neceſſary to begin earlier, by a fortnight or three weeks, to ſow your ſeed-bed, than common. The beſt ſeaſon to ſow the ſeed (that you propoſe to tranſplant out) is, in the laſt week of Auguſt; and that which is ſown, as hereafter directed, a ſingle grain to each ſquare foot, in the firſt week of September.

Ground moſt ſuitable for this purpoſe, is a deep rich loam, clay, warp, or haſle earth; ſuch muſt be ſown or tranſplanted at one grain to each foot.

Fallow-land is beſt, except ſuch as is trench-plowed; though clover, peas or beans, ſtubble, turnip, fallow, rape-ſtubble, potatoe-ground, or any land that can be depended upon for a wheat-crop, in any other method, will bring a crop with much more certainty in this; except the ground be dirty, or given to weeds: in this caſe, the remedy is to trench-plow; as directed in the firſt volume; or fallow the ground all winter, and have your plants growing in a ſeed-bed; by this you take the advantage of a proper ſeaſon to ſow your ſeed; and the plants are growing, at the ſame time you are enriching your land, deſtroying the weeds, &c.

The plants will be pretty ſtrong, by the firſt week in February; therefore, being placed in the ground immediately after the laſt plowing, they will be able to ſpread over, and fill the ground, before the weeds can take root; ſo conſequently will ſuppreſs and effectually deſtroy them; but the very firſt favourable time for removing the plants, in February, muſt not be miſſed.

This method of huſbandry is ſimple, and eaſily learned; all you have to do is, to fix the machine, as directed in the cut;

and, for ſowing the ſeed, fix the pins ſo, that they will ſink; or make the holes two inches deep, (but the holes that are to receive the plants muſt be three inches deep); this is all the machine wants to be altered in, between ſowing or ſetting the plants; provided the ground be all of a richneſs; but as the ground grows worſe in quality or richneſs, the plants will require to ſtand nearer together, at nine or ſix inches diſtance, according to the ſtate or ſtaple of the ground; becauſe the plants will not ſpread or branch ſo much in thin gravelly or ſandy land, as they will in the above-deſcribed rich deep loams; neither are the above lands ſo proper for wheat; they ſhould be ſuited with ſuch crops as are natural to them, as oats, barley, rye, turnips, clover, or ſome ſort of pulſe; but even ſuch weak land will force out branches, according to the condition it is in for richneſs.

Therefore, it will anſwer nearly the ſame end, and ſave a good deal of labour, if, inſtead of altering the pegs in the machine, to hole at nine or ſix inches aſunder, you make your holes at twelve inches aſunder, in all ſorts of land, and add ſo many grains in each hole, as your land lowers in value, or ſtate of richneſs; as for inſtance, in rich clay, loam, or warp-land, put one grain in each hole; in haſle-earth, or a loamy ſand, put two grains in each hole; in a ſtrong ſhallow gravel, drop three grains in each hole; and in a ſand, four grains in a hole.

Seeds, thus placed, will be able to find out all the nouriſhment within ſix inches round; and, when ſown in the centre of a ſquare foot, they have no further to go; and as they ſtand thus regular, if you ſee encroaching enemies of weeds, graſs, &c. you may hoe between them. Two men will hoe an acre in a day; for what moſt delays all hoers, is their looking out the ſtrongeſt plants, and the proper diſtances; but this is all provided againſt, when ſown thus regular.

Obſerve, as much as conſiſts with your ſituation, to remove your plants from worſe to better land; which will encourage their growing or branching, much more than if they were tranſplanted from good to bad land. I need not refine upon this point more, than to ſay, it would as ill agree with their conſtitution, as it would with that of a high-fed perſon, were he obliged to leave a full-ſpread table to feed upon potatoes and butter-milk. This obſervation ought to be carried through the whole courſe of huſbandry; that is, always for a farmer, to take his cattle and ſeed from worſe land to better.

The beſt way is, for a farmer, to divide his work thus; that is, to ſow one half of his wheat, and tranſplant the other; and to raiſe his plants as follows, viz. ſow juſt double the quantity of ſeed, in each hole, as he intends to ſtay there; and when the ground is ready, pull up half the plants for tranſplanting, and leave the other half in the ground; by which means he will do double the work with the ſame people, and go on by a regular mathematical rule, which cannot err; as his own reaſon muſt tell him, that by the ſame rule one grain in a field will grow, they all muſt, that are ſound, (and if he ſwim his ſeed, the unſound grain may be taken off); as they lie in the ſame ſituation or latitude, not one being the tenth of an inch deeper in the ground, or covered with more mold than another; and as they lie in the centre of every ſquare foot, if the land, in a field, be all of one quality or degree of richneſs, by the ſame rule that one foot will produce thirty ears from a grain, every one muſt, or thereabouts.

Another advantage is, that a farmer can manure his ground at a cheap rate, and at the ſame time be ſure that every grain feeds equally upon it; becauſe he may drop an equal quantity into each hole, along with the ſeed; as directed under the title of the compound manures.

He alſo feeds his land and grain by the thick coat of manure he wraps round his grain by candying it, as directed in the receipt of liquid manure. Thus he ſees, that every ſtep he takes, in this regular method, is valuable and intereſting; and a narrow underſtanding may go through with it; as every thing is ſo plain and ſimple.

The machine being fixed, he muſt have a ſober, gentle, tractable horſe, and a ſteady man to guide him ſtraight; and always come back in the track the marker makes going; for the marker is fixed ſo, as to reach half-way into the following breadth.

The beſt way is, to go acroſs the ridges, as it works in the nature of a roller; but, in open town-fields, where ridges lie ſingle, he cannot; therefore he muſt keep lengthwiſe of his ridge, and make the machine, as it will agree with the breadth of the ridge, either to take it at two, three, or four times: a little foreſight and experience will help him in this.

One man and a horſe will hole four or five acres in one day, with eaſe; each child will reach to drop ſeed or plants into three holes in its breadth, going up and down; and four children, at about three-pence a-day each, will finiſh an acre; but a man muſt follow them, with a rake to cover the ſeed.

If it be plants he is tranſplanting, he muſt have a hoe, and draw the mold a little higher about the roots than in other places; that when the roller goes over it, it may bear harder upon the lumps, ſo as to ſettle firm the earth about them; and they muſt be rolled as ſoon as tranſplanted.

When the plants are taken up, a perſon muſt go, with a three-pronged dung fork, and run it down, to lighten the earth; and children muſt be ready to draw up the plants, without breaking the roots.

The fork need only be uſed, where the land is ſtrong, ſad, or ſtubborn; land of a lighter, looſer ſtaple, is moſt proper for a ſeed-bed; which will have ſome trouble.

Any ſort of grain, graſs, or ſeeds (flax-ſeed excepted) may be ſown thus; but ſmall ſeeds may deceive you, as to their vegetating principles, eaſier than corn.

Therefore, it is adviſeable to try them; the quickeſt and ſureſt way to do this is, to lap a few grains up in a woollen cloth, and dip it in water; then put it into a couch of malt, in its growing ſtate; and every grain in the cloth will vegetate, if it has not loſt its growing quality; and according to the quantity that grows, judge therefrom, by dropping more or leſs into each hole.

One grain in every ſquare foot, if good, is enough of theſe articles, viz. turnip, rape, cabbage, turnip-cabbage, cole-ſeed, burnet, lucern, or clover; but, for fear of accidents, you may drop two, if good; and three or four, as you ſee need requires, if bad; it is better to have too many than none; but they are recoverable either way, by planting in miſſed places, or by thinning where over-thick; however, the latter is the quickeſt; for, being ſo regularly placed, three weeders will draw up the ſuperfluous plants, in a day, from an acre.

I am not ſo much a ſtranger to the nature of man, but that I know very well what the moſt illiterate and bigotted ſort of them will ſay, upon reading this. I know the taunts, jeers, and criticiſms they will throw out; however, I would have them to ſuſpend their judgment thereon, till they try it; neither would I deſire them to run much hazard on the firſt trial; becauſe half an acre, or an acre in the middle of a field, will ſhew what might be expected from any larger quantity; and ſo they may enlarge their trials, as they ſee they anſwer.

A TABLE

Shewing the Expence and Profit of an Engliſh Acre of WHEAT, ſown or tranſplanted in the new regular, diagonal Method, with the tranſplanting Machine.

	l.	s.	d.
To the rent of the land, for two years, ſuppoſing fallow -	1	10	0
To ten plowings with one man and two horſes, at 2s. and 6d. per - - - -	1	5	0
	2	15	0

	l.	s.	d.
Brought over - -	2	15	0
To four children, to drop the ſeed, at 3d. per - - -	0	1	0
To one man to cover it after them - - -	0	1	0
To holing the land - -	0	0	4
To the compound, about -	0	1	0
To 43,560 grains of wheat, weight about 4 $\frac{1}{2}$ pounds, and $\frac{1}{2}$ an ounce - - -	0	0	4
To levelling with the harrow, before ſowing - -	0	0	6
To rolling - - - -	0	0	6
To harveſting - - -	0	10	0
To tythe - - -	0	5	0
Total expence	3	14	0
Produce 42 buſhels of ſeed, at 5s. each - - -	10	10	0
Clear profit	6	15	4

Straw pays for threſhing.

	l.	s.	d.
Brought over clear profit -	6	15	0
N. B. If the land be trench-plowed, it will ſave four plowings, at leaſt - -	0	10	0
And alſo a year's rent - -	0	15	0
So that, in this caſe, the clear profit will be - -	8	0	4

In order to ſupport the foregoing method of tranſplanting and thin-ſowing, amongſt many other experiments, the following chapter was tried by myſelf, very minutely, in 1764.

CHAP. XXVIII.

Experiments made in 1764, by the AUTHOR, to find out the true diſtance, or quantity of Land that WHEAT ought to have, to grow upon.

IN 1764, I finiſhed making my machine, that harrows, ſows, and rolls at one time; and as it will ſow any quantity of grain, on an acre, the broad-caſt way, I was reſolved to make a trial in the method of ſowing wheat thin on the ground; it being always my opinion, that a great deal of ſeed was loſt, or thrown away by the old method.

However, I was in ſome degree diſappointed in the ſeaſon; becauſe it was the firſt week in February, before I finiſhed my machine, therefore out of wheat-ſeed-time; but, being full of the thing, I was reſolved, though late it was, to try with a little.

And to make my experiment good, I fixed upon the middle of a fifteen-acre field, which had three different ſorts of land in the length of the ridge, which was forty perch long. One end of the field lay low; the ſoil was a ſtrong, loamy clay; the middle was a high hill; the ſoil at top was a kind of clay-gravel, very ſhallow, and mixed with a middle-ſized paving ſtone.

The other end was not ſo low as the firſt; neither was it ſo ſtrong a clay; but was what we call a loamy ſand: upon the whole, it was very good wheat-earth; but the bottom of the field was rather more ſo; the top of the hill was more proper for barley than wheat.

This field had been much worn by long tillage, and was much inclined to weeds; the laſt crop, which was oats, was but indifferent, and full of weeds: but, in order to recover the land, and kill the weeds, it had been fallowed two years;

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in which time it had got only ſeven plowings; which, if I had had the management earlier, as I had not, ſhould have been at leaſt twice as many; but it only came into my hands the Michaelmas before; though, upon the whole, it was in good order, and by far a better fallow than the common run. I gave it a thin top-dreſſing, of wet turf-aſhes (for I had no other) and harrowed them in with the ſeed.

I meaſured two ridges very exactly; and, on the fifteenth of February, I ſowed fourteen ounces on one ridge; which, according to the meaſurement of the ridge, was at the rate of ten pounds to the acre; on the other ridge, I ſowed twenty-eight ounces; which, according to meaſurement, was at the rate of twenty pounds to the acre.

The ground was very wet; and the horſes ſunk as far as the plow went; however, the ſeed was not trod in, becauſe it was ſown between the harrow and the horſes feet;

ſeet; but the harrow could not come over it the ſecond time, without making the ground in mortar; ſo that it was only harrowed once in a place; therefore, I am clear more than half the ſeed lay bare, or uncovered; but as the ground and weather was wet, it ſoon vegetated, ſo that (except what the fowls got, which I believe was not much) it all grew.

Though the machine ſowed the grain pretty even, yet, as the land was rough from the plow, it tumbled into holes; and as the earth clogged or ſtuck to the harrow, it dragged ſome on heaps. But, however, all this afforded me a better opportunity of proving my experiments for a future event. For, if each grain had been placed at a regular diſtance, they would have lain within about ſix or ſeven inches of each other; ſo that I could not have had an opportunity to know how they would grow at the diſtance of nine, twelve, eighteen, or twenty inches. But, as they fell by chance, and irregular, it afforded ed matter for ſpeculation, in this caſe; and as the ſeed was not covered with a rake, or hoed, or nurſed, in any degree, it made me thorough maſter of the ſubject; and a fairer trial never could be made; for I ſowed the reſt of the field with barley and clover; and I ſowed this wheat alſo with clover, at the ſame time, namely, about the tenth of May, and rolled it acroſs, along with the reſt of the field, gathered the ſtones, and carried them off in a tumbrel or box, fixed (as I always do) upon the frame of the roller.

About ten days after the ſeed was ſown, it began to ſhew itſelf above the ground; from this to the time it had done ſtooling or branching, I ſeldom miſſed a day without a viſit to it; ſo that I cloſely obſerved all its ſtages, ſituations, or motions.

I meaſured, and noted every diſtance I could diſtinguiſh any alteration in the plant; and found, that, in general, where a plant had the moſt room, it made the moſt ſhoots from the root, particularly in the good ground, till it came to the diſtance of about eighteen inches, that is, about nine inches each way. If they ſtood thinner than this, it made no great difference; becauſe the blades, not being above nine inches long, did not meet with their neighbour, to obſtruct each other in ſpreading.

For the nature of a plant of wheat is ſuch, that it grows perpendicular, till it is weaned from the kernel, that is, till the flour of the corn have all grown into top and root; for it divides each way, and leaves the chaff or huſk in the middle, ſtanding perpendicular at the ſurface of the earth, reſembling a blown egg-ſhell.

As ſoon as all the inſide or flour is exhauſted; ſo that the blade or top has nothing to depend upon for nouriſhment but the earth, the two blades open, and fall flat on the ground at the two oppoſite ſides of the root; then, as faſt as the root gathers ſtrength, it throws or forces out more plants round it, till it forms a figure like a ſtar, or an open full-blown marygold; and thus the blades keep growing, and creeping along the earth, till they meet with ſome living obſtruction, as graſs, weeds, or corn; immediately after which they raiſe up the points of their graſſy blades, and give over ſtooling; and what is very extraordinary, though there ſhould be more room at one ſide of the root than the other, yet they all bear as it were harmony, and concur with each other, as if they were ſenſible of an affront put upon them by an encroaching enemy; therefore, I ſay, when one blade is obſtructed, that root generally gives over ſtooling, and riſes to a perpendicular direction.

In rich, clean, good, well-tilled land, a plant of wheat may ſtool to fill eighteen inches ſquare; yet I choſe to fix my ſtandard to one foot ſquare in good land; as that will bring forth to maturity, from twenty to thirty ears, which I found to be as many as had ſufficient room to grow out of one root; I ſay, one foot ſquare will bring thirty ears to full maturity from one root; but were theſe thirty ears to have thirty roots, in the ſame ſpace of land, they certainly would fall down, and what we call root-welt; but if they ſtood, the ears and grain in them would be ſmall and good for little: this I have accounted for in another place.

As I obſerved, the blades of a good ſtooling-plant fall, ſpread, and creep along the ground; but if it be crowded when young, it throws up a perpendicular leader or ſtraw, from the middle of the root; and though it be thinned afterwards, yet it never changes the firſt bad ſet it gets; but this perpendicular leader takes up all the crown and ſubſtance of the root. It is true, upon being thinned, it will throw out more ſhoots round about; but they will be ſmall, and good for little; and a ſtooling root of wheat is not good, except the ears be near of an equal ſize. Though I had ſome ears that were only about three inches long; yet moſt of the good ſtooling roots had not an ear but what was from five to ſix inches long; for they were all nearly of one ſize.

I cut ſome of the leaders off, from thoſe plants that were likely to be bad ſtoolers; and I found that this was the remedy to make them ſtool well: therefore, it is a good thing to turn ſheep in, for that purpoſe, after weeding or thinning; which would make them ſtool amain. But the beſt method that could be taken with a crop of wheat, ſown in the old or new method, would be, to hoe it.

I had ſome roots, that produced upwards of fifteen hundred-fold, having from twenty to thirty ears at a root; but this was all in the good land, at the loweſt end of the field, which was moſt inclined to clay; the wheat at the other end, that was inclined to a ſandy loam, ſtooled full as well; but the corn in the ears was not ſo plump or large, neither were the ears ſo long or well ſet, but ſloamy; and the chaſes ſtood thin and wide; ſo conſequently could not produce, in the ſame length of ears, ſo many grains.

As to the middle of the land, which was a high gravelly hill, and a ſhallow ſoil, it was hard to find above fifteen ſtalks or ears from one root; however, the ears, though not quite ſo long, yet produced as much real ſubſtance as the beſt; for they were thick and well ſet, with a large bold grain.

This was all from the ridge that was ſown the thinneſt, at the rate of ten pounds to the acre.

As to the ridge which was ſown at the rate of twenty pounds to the acre; it was impoſſible to find a root with above ſeventeen ears at it, in the beſt part of the land, and ſo in proportion in other parts: this was the moſt convincing thing of all to the reapers and by-ſtanders, who were all helping to ſeek; and they found more on the thin ſown-ridge at thirty ears and upwards to one root, than on the other ridge at ſeventeen ears to a root.

This gave me ſo great an inſight, that, I think, I would not have miſſed ſowing the ridges with two different quantities of ſeed as above, for fifty pounds; for it did not only convince me, but it convinced thoſe by-ſtanders, who were the moſt averſe to thin-ſowing, and who uſed frequently to rally me, in their old canting way, that, if I did not ſow, I could not reap.

My field lay along by a high-road-ſide, and was the ſubject of many a taunting joke to the travellers, which I have often heard, when I was at the inſide of the hedge, unknown to them; particularly one day, two farmers were going by, and one ſaid to the other, "See, Paddy, where the Engliſhman is ſeeking for a plant of wheat;" (for I was counting how many ſtalks grew out from one root). "Yes," ſays the other, "but he will not find many without "his ſpectacles." Anſwered Paddy, if they "have no better crops in England than "that will be, they muſt be obliged to have "relief from poor old Ireland, as well for "bread as beef; or they could not be able "to beat the French."

Indeed, my wheat, at that time, cut a poor figure to a traveller; for the land was a little rough, and the plants were flat on the ground; ſo that a perſon on the road could ſcarce ſee any appearance of corn, till about the middle of April; then it began to cock up its head, and, by the fifteenth of May, it had covered the ground, and was a full flouriſhing crop; then people wondered where it came from; ſome would have it, that I had ſowed the land over again; others reported, that I filled the ground, by taking it out of other fields, and tranſplanting it there.

Thus various reports were ſpread; however, at harveſt, when they ſaw the many ears from one root, and the length of the ears, &c. they were obliged to let their falſe reports vaniſh. But their malice did not end here; for, a few days before it was reaped, ſome one went up and down each ridge, and cut off a great many of the largeſt ears.

This vexed me greatly; however, after all, I had fifty-three ſtone five pounds of the fineſt wheat I ever in my life ſaw. Every ſheaf yielded a ſtone, or upwards; but the ſheaves were made large; the produce was at the rate of about twelve barrels to an Iriſh acre; which is near equal to thirty-two buſhels to an Engliſh one.

I picked as many ſtalks, which had the ears cut off, as made two large ſheaves; this was, in order to give as near a gueſs to the crop, as poſſible; but, doubtleſs, a great many eſcaped me; and perhaps ſome were broke off from the root in cutting; theſe I could ſee nothing of.

The crop was late; before it was ready to reap, it was the latter end of October: it happened to be a fine dry time, or it is a doubt to me, if it had been wet, if it would have ripened well at all; for it was ſown too late; and was ſtill put back by having to branch out.

I muſt not forget to obſerve, that I did not pickle, wet, or lime my ſeed at all; for it was the firſt time I had tried my machine; therefore I was afraid, that, if I wet the corn, ſo ſmall a quantity would not run and ſpread ſo even, out of the hopper; as the orifices were obliged to be ſo very ſmall to diſcharge it.

I muſt alſo tell my reader, that the ſeed was of different ſorts; ſuch as red lammas, white lammas, the long-eared wheat, and two or three ſorts of bearded wheat. I found a great deal of difference in the produce, both in the ſize of the ears and in the ſtooling part; the red lammas was the beſt; the long-eared wheat the next.

I expected the white lammas ſhould be the beſt; but it was not. The greateſt produce, in number of ears, was from the long-bearded wheat; and I could like it as well as any of them, to ſow thin.

There was another ſort of bearded wheat, of which the beard, ear, and ſtraw, were ſhorter than thoſe of any of the reſt; but it produced a great many little ears; I did not like this at all; it was the worſt of them all; and there were more ſorts than I can mention.

I ſowed the reſt of the field with barley; with different quantities on an acre; on one ſide of the wheat I ſowed an acre with ſixteen ſtone, the old accuſtomed quantity; it was not worth reaping; for it was all lodged, and grown green through, before harveſt;

except a top of the gravelly hill, and this was ſmall like hen-corn.

I ſowed an acre on the other ſide of the wheat, with three ſtone, which was a very good crop, for it branched to fill the ground with a fine long-eared corn; it branched from two to ſix or eight ears out of a root; according to the diſtance the grains fell from each other, juſt ſo they ſtooled or branched till they filled the ground.

I produced ſome roots to the Right Honourable the Dublin Society, with fifteen ears at them, and wheat with from twenty to thirty ears at each root.

The remainder of the field I ſowed with eight ſtone of barley to an acre, which was an excellent crop.

I forgot to obſerve, that I found a root of bere or winter-barley among the wheat, that had fifty-three ears at it, and ſome of the ears had above an hundred grains in them: this grain, in general, is a very great planter, or ſtooler; but the grain is much ſmaller than barley, and longer; in fact, it is not a comely grain at all.

I mentioned theſe facts juſt as they happened.

I often hear of people producing, out of gardens, roots of wheat, &c. with ſixty or eighty ears at them; but theſe can be no experiment for improvement; an experiment can never be rightly tried out of its own ſphere or latitude, in which it is wont to grow, or muſt be cultivated in: it cannot be expected, that a farmer can turn his fields into gardens, and cultivate every plant as he would one in a garden that is nurſed.

Every thing loſes its value by being too expenſive and troubleſome: however, it was not the caſe with this experiment, for it had not even equal juſtice done it. But it convinced me of the quantity of ſeed that ought to be ſown on an acre, and at what diſtances each plant ought to ſtand.

The next thing I had to find out, was an eaſy method of doing this, and alſo ſome method to prevent vermin from taking the ſeed, in order to remove that old ſaying of a farmer, that he muſt ſow ſome for worms, and ſome for fowls. I refer him to the compound to prevent this malady.

The END of the Firſt Volume.

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